UNITED STATES OF AMERICA

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ARMED FORCES EPIDEMIOLOGICAL BOARD

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MEETING

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THURSDAY

JUNE 27, 1996

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WASHINGTON, D.C.

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The meeting commenced at the Walter Reed Army Institute of Research, Room 3092, Building 40, Gerald F. Fletcher, Chairman, presiding.

ATTENDEES:

GERALD F. FLETCHER, M.D., Chairman

DR. JOHN R. BAGBY, Ph.D.

DR. CLAIRE V. BROOME, M.D.

DR. JAMES CHIN, M.D., M.P.H.

DR. JACK M. GWALTNEY, JR., M.D.

DR. ELISA T. LEE, Ph.D.

DR. RUSSELL V. LUEPKER, M.D.

DR. DENNIS M. PERROTTA, Ph.D.

DR. GREGORY A. POLAND, M.D.

DR. WILLIAM SCHAFFNER, II, M.D.

DR. CLADD E. STEVENS, M.D.

COL. TIMOTHY FINNEGAN
British Medical Liaison

CDR TRUEMAN W. SHARP
Preventive Medicine Office
Marine Corps

LtCOL. MICHAEL PARKINSON
Preventive Medicine Office

CAPT. DAVID H. TRUMP
Deputy Director
Preventive Medicine
Department of Navy

CDR. ARDAY
Commandant, U.S. Coast Guard

COL. FRANK O'DONNELL
Commander, Health Services Directorate
Office of U.S. Army Surgeon General

COL. VICKY L. FOGELMAN
USAF, BSC, AFEB Executive Secretary

A-G-E-N-D-A

P-R-O-C-E-E-D-I-N-G-S

(8:00 a.m.)

COL. FOGELMAN: Good morning. This is the Armed Forces Epidemiological Board, 27 June 1996. Anyone who is not here for that meeting may disembark now.

(Laughter.)

I've been on too many plane trips lately.

I'd like to welcome some special guests this morning. MGen. Leslie Burger, the Deputy Director for Medical Readiness from the Joint Staffs at the Pentagon. Col. Chip Patterson, the Deputy Director of Scientific Activities, from the Directorate of Clinical Services in the Office of the Assistant Secretary of Defense for Health Affairs.

Welcome to all of the Board members, and to the Preventive Medicine officers, and to any other guests who I may have missed.

I'd like to say goodbye to Cdr. Clifford. Cdr. Clifford, our Canadian Liaison, is going to be retiring -- is that right? -- retiring or leaving --

CDR. CLIFFORD: Not for another year -

- leaving.

COL. FOGELMAN: I'm sorry -- leaving his post here in Washington, and he will become the Commander of the Canadian Forces Hospital in Halifax. Is that correct? So this will be his last meeting, and we want to say goodbye to him.

CDR. CLIFFORD: Thank you.

COL. FOGELMAN: Thank you very much for your -- we wish you well in Halifax.

I would like to announce one agenda change today. If you'll look at your agenda, please, where we have 10:30, the classified Chemical Agent Briefing by Col. Koenigsberg. He had to cancel due to another high priority in the Pentagon.

So, what we'll do is ask Dr. Jones -- is Dr. Jones here yet? Do you think he'll be here by 10:30? We'll ask Dr. Jones if he can give the Injury Working Group Report during that time. And then we will still have our classified briefing on BW Defense Update at 11:15.

For those of you who have not been here before, we have restrooms -- there are restrooms in WRAIR. For the ladies, if you go

off to your left at the end of the hall, about 20 yards down, just past the stairwell on your left, there's a restroom. For the gentlemen, if you go to your right and then, as you come to the stairway, take another right -- I think I'm right here -- you'll find a men's room in that area. There are also restrooms on other floors, but those are the two that are up here.

For lunches, we are going to have a working lunch today for the Board members. For those of you who have not paid your $2.00 for a box lunch, that's fine but, if you wish to eat, you probably need to give $2.00 to Sgt. Camora at the break -- she's standing right here -- anybody who hasn't done that.

We'll also be getting a little briefing by Dr. Fletcher during lunch, on the AFEB history. That's all I have.

Does anyone have any questions before we go on with the agenda?

(No response.)

I would like to let Dr. Fletcher, our new President, make some comments.

CHAIRMAN FLETCHER: Thank you, Vicky. I just want to acknowledge the hard work of Jean

Ward and Vicky Fogelman for putting things together. They seem to fall into place, and we've had a lot of help and conversations about some issues that will come up today, and we will begin those very soon.

Our new members -- some have asked about new members. They will be onboard with us at the Colorado meeting. There are some deterrents. As all of you remember, there is fingerprinting and all these things that sort of have to be processed and it takes time. But I really think we will mention that at the Executive Board meeting, our new members, and I think you all will be pleased that we have a lot of replacements and fill-ins for the various subcommittees, or committees rather, particularly Dr. Schaffner's group on Disease Control, which has been the major driving force. I think you have people leaving, but people coming in that will be very excellent for this committee under his leadership.

Dr. Perrotta, who also is continuing on in his area of environmental control, we'll have some new members there. And our smaller Committee of Wellness and Health Enhancement will

have some exciting new members that you'll hear about that I think will make this component of the committee more vivid and more accurate in helping along with that.

As Col. Fogelman said, we will have lunch in. This has sort of been the decision to help expedite the day's activities because I remember the last time here, we were dispersed out to various places to have lunch, and Jack Gwaltney and I ended up in the basement, I believe, and found a vending machine, and I'm not really sure what happened. I think we lost several people during that process, so we thought we would keep people captured in. And lunch may not be fantastic gourmet cuisine of this area, but it will be basically health controlled, and I think most of you paid your $2.00 for that. So, we'll move to the luncheon with that, and hopefully we'll out equal to or less than four o'clock and, if some of you have to go, but please stay as late as you can, for other commitments. I know it's a busy month.

So, Vicky, I think that's all I have to say. We can move along, I believe. Any comments or questions from anyone at this point?

We'll try to stay on schedule.

COL. FOGELMAN: I would like to once again thank the staff at WRAIR for providing us with great support in having this meeting. They're always very accommodating to us. They drop everything they're doing to help us. I think we actually ought to give them a hand.

CHAIRMAN FLETCHER: Oh, yes.

(Applause.)

Let me sort of echo that. Also, in processing things we're doing in the AFEB, Dr. Steve Joseph has been very cooperative in a very busy area of Department of Defense. He's been very stalwart behind our week here, and I think this has a lot to say for what we will be doing in the future in AFEB to sort of revitalize what's been done in the past. So, let me just acknowledge him in his absence, and he will definitely be with us in the August meeting in Colorado Springs.

COL. FOGELMAN: In fact, he sends his regrets today, he has TDY.

CHAIRMAN FLETCHER: Okay. I believe we can move on. Our first issue this morning is, as we follow the agenda, Sickle Cell Policy.

We've been asked by Dr. Joseph, from Department of Defense, to look at this again, and maybe to respond again as to the impact of the sickle cell trait in the Armed Forces, and we've done a fair amount of discussion by telephone. Certainly, as a cardiologist in Preventive, this is not my expertise. But I've certainly spoken with some of my colleagues, and we have been pleased and happy to have an expert who has been able to work into his schedule to drop by and be with us this morning.

Dr. John Kark is Associate Professor of Medicine in the HEMOC Section of Howard University Medical School in Washington. Dr. Kark is here, and he represents, as I understand from Drs. Hardin and Ogles, that Dr. Kark has the state-of-the-art in this. So, we want to thank you for coming here and have a brief presentation, and I'm sure he'll leave us time for discussion, comments, questions, so forth, so you can respond. Dr. Kark, thank you very much.

DR. KARK: It's a great pleasure to be here, and this is really an appropriate forum because the work I'm going to be discussing is primarily epidemiology, the technique we use when

we don't really understand what's going on with a disease.

First, I want to present the conventional view of the etiology of exercise-related death in apparently healthy young men because that's really the issue here. We're talking about unexpected deaths in military recruit training primarily, and that's been the issue with sickle cell trait, as I'll show you shortly.

The standard approach is to collect case series in which you look at the autopsy, and hopefully the clinical history, and I've collected what I thought were the highest quality studies. They've been nicely summarized in this reference given below here, Cardiology Clinics '92 have a little book on this, on the athlete's heart.

And the conventional view is that about 90 percent, nearly 90 percent, are due to silent cardiac disease which is found at autopsy and wasn't recognized clinically; maybe 7 percent are unexplained cardiac arrhythmias in which the heart was normal; 3 percent are due to conventional illness, they are not really sudden

deaths -- and that's a confusing issue, they are nonsudden. Sudden deaths are usually defined as a critical illness with coma occurring within an hour, so that unsupported the patient would have died within an hour.

But exertional heat illness usually kills people over hours or many days. Rhabdomyolysis, for example, usually takes seven to ten to 14 days. You die from the complications of renal failure and metabolic problems.

And then there's another category, sickle cell trait. It's not really separate, it's overlapping. Some of the cases with cardiac arrythmia and some of those with heat illness are also associated with sickle trait. And then 1 percent are other, such as Berry aneurysm, and that's consistently present at a low level. So, that's the conventional view.

Then when you break these down, you find some major differences, depending on whether you're looking at population-based studies, which unfortunately are pretty much restricted to military. This is Air Force recruits, focused on sudden deaths. You see there is quite a few unexplained cardiac deaths and heat illness

deaths and a fair amount of trait. This is an Israeli group, didn't have anyone with sickle trait.

There was one population study done in Maryland, done here at AFIB by Allen Burke and Virmani, and they only did sudden death, so they didn't have any heat illness, and had very few unexplained cardiac deaths.

That's in contrast to most of the population-based studies, except for Waller, who has about 18 percent unexplained cardiac deaths. So, on face value, when you read the articles, that's what you see, but when you look at them in a little more detail some other things pop up.

The first problem is that there's a tremendous amount of selection bias because these are referrals. Marin's famous paper on asymmetric cardiomyopathy selectively took top competitive athletes, and these are people who maybe did a lot of weight training and other things.

A lot of cases are referred because of specific expertise, so there's a lot of potential for selection bias. Also, there is bias in the criteria used to find cases. In Burke's very

nice population-based study in Maryland, he had to restrict himself to sudden deaths, he couldn't look at nonsudden deaths, so it's not really a full view of exercise-related death, although it's a good study of sudden death.

In the past, there have been problems with unclear definition of sudden death. That's not too much of a problem for publications since the mid-'80s.

One big surprise for us is that it turns out that reliance on the death certificate or final autopsy. Even a final autopsy diagnosis is not very reliable, and I'll show you that, and that's why this work has to be researched and not just casual surveillance.

It was a major surprise to us, but you need eyewitness accounts, clinical evaluation, as well as the autopsy to decide how people die, and that's partly because in sudden death there's very little time for diagnostic, histologic changes to occur, and they usually don't.

And, finally, it would be important, as I will show you, that body temperature and serum assays to rule out rhabdo be measured, and that's seldom done. Just not routine.

I'll skip over this slide. The only thing I want to point out in here quickly is that if you analyze these cases carefully, the ones that are fully described had 172 that were cardiac deaths. There's actually a much higher rate of unexplained cardiac death with a symmetric cardiac hypertrophy which is considered benign -- I have it, so I hope it is benign, as a result of a military career -- and a normal heart, so that these really are consistently about 30 percent, not the 7 percent that's conventionally thought. So, it's a much bigger component of death in young adults.

What are the ideal features for study, and that's shown here, and we can come pretty close to that with recruits. Recruits aren't too bad as a representative population for the military. You can certainly study all deaths, there are redundant systems. I know of about six different systems for finding these cases. So, you can avoid selection bias.

All the deaths in exercise are witnessed. Recruits are never by themselves in training. They all have some kind of formal clinical management which is recorded, full

autopsy, toxicology, and there's a formal investigation report which collects eyewitness accounts. And in our case series we have more than 90 percent of all these things on each case. So, very high quality. Also, many of the cases are reviewed by subspecialty experts at the AFIP and at universities. So, when you look at diagnoses based on this, one of our big surprises was there was a 50-percent error in the death certificates. That's maybe not so surprising, but there was still a 30 percent error for the full autopsy done locally. So, there was a big error rate if you don't look at other materials besides the autopsy protocol.

And, again, we'd like the clinical evaluation to include body temperature and serum assays to exclude rhabdo, but those are seldom available, especially in a sudden cardiac arrest. That's just not routine to look for that.

Now, let me just remind you what sickle cell trait is. Hemoglobin molecule is made up of alpha and beta chains that are determined on completely different chromosomes not located anywhere near each other. That's important because a change in alpha is going to

turn out to be a marker for what's going on with the beta. I'll show you later.

There's a single genetic mutation, the A here becomes a T so instead of having a negatively charged aminoacid, you have a neutral aminoacid, and that allows the dioxy form -- here is the oxy form, which is the same in A and S -- but the dioxy forms are different. Dioxy-S, because of this loss of charge, is able to bind to itself and form complex polymers or fibers that have about 14 chains within them.

And as you can imagine, that produces long rods inside the red cell. It makes the red cell very rigid. Since the red cell is actually a little bit bigger than the capillary it has to get through, this means that the cells containing this polymer in the dioxy state can obstruct blood vessels. So, if that happens, probably as a random event, to a lot of blood vessels in the same tissue, you'll get tissue infarction. And that's the underlying reason for most of the complications associated with hemoglobin-S and sickle cell disease, or sickle trait.

The conditions that produce this are well known in the lab. Low oxygen, acidosis,

dehydration, and a high temperature all promote polymerization of dioxyhemoglobin-S. And those, of course, are changes that are normal in exercise, and they are exaggerated when you get the serious complications, life-threatening complications of cardiac arrest, heat stroke, or other forms of heat illness, and muscle necrosis, rhabdo, which I lump together with heat illness because they often occur together and they are tightly associated with each other.

When you're talking about this subject, you want to keep in mind three common genotypes. The AA is normal, the AS person has normal looking red cells, and no evidence of emulysis, and the complications are seldom significant. There is one minor complication that's commonly present by the time you are 17 or in your 20s, and that is -- I'll show you later -- a renal lesion. That's the only part of the body that's affected by sickle trait regularly. Otherwise, complications are quite rare.

SS is the most common genotype for sickle cell anemia, and morphology is often abnormal, and hemolysis is always present, and complications are frequent with the medium

lifespan in America in the 40s -- for males 42, females 48.

There are some other genotypes in which there is something else instead of the second S -- SC, for example, is very common. S-beta-thal.

So, if you look at sickle cell trait as a risk factor for exercise-related death, the syndrome is an unexpected death or a person who manages to survive with intensive support. They present with exertional heat stroke, rhabdomyolysis, often a combination of both, occasionally with just isolated renal failure -- that's more common when people are taking high levels of salt -- and mixed syndromes. And then about half of the cases turn out to be sudden cardiac arrest, unexplained by any pre-existing disease.

Recruits with sickle trait have a higher case rate, as I'll show you, for both categories, but there are no distinctive features in their clinical or histological analysis. So, it's an association rather than a demonstrated pathogenesis.

So, the histology at autopsy can't

establish a role for hemoglobin-S because there are no specific gross lesions such as occur in renal infarcts with hematuria, which is specifically related to sickling, and the splenic infarcts that occur with hypoxia in people who have sickle trait.

So, we were asked to study this in 1981. The major information we had was from these two papers, which are good clinical descriptions; the upper one of the sudden cardiac arrest syndrome, and the lower one of the life-threatening exertional rhabdomyolysis which is most characteristic of people who have sickle trait.

Since the vessels obstructed by sickled erythrocytes in histologic sections are nondiagnostic, you can't tell what happened from the histology. The problem is that when you -- when a person dies or you biopsy a tissue, you're going to have ischemia, and there's going to be sickling obstructing the vessels anyway, so you can't distinguish primary from secondary changes.

So, the only way, at that point in time, that we had to examine a relationship with trait was to show a high relative risk. In other

words, the complication you were interested in had a much higher incidence in the population with trait than a population without trait, with AA hemoglobin, and that's basically what we did.

We looked at this five-year period with a little over 2 million recruits. We focused on the black recruits, and most of my data will show that, because we know the prevalence of sickle trait very accurately among blacks, and it's not as accurately define -- it's about 100-fold, or 200 -- about 200-fold less among nonblacks in the military, based on a survey that was done on 20,000 recruits. But it's more accurate within the black group, so I'll show that.

We divided our cases of exercise-related deaths into sudden and nonsudden, and classified those as unexplained or explained, depending on whether there was pre-existing disease, the major issue usually being heart disease.

And this just describes our methods. We had 64 natural deaths. I have a table in your handout that shows the breakdown of the other cases. The major other form of death, of course,

was infectious disease.

And this is the main result. What we're seeing here is that although the trait population is only about 1.7 percent, they were accounting for a pretty large fraction of these 41 deaths especially, obviously, the deaths unexplained by pre-existing disease. There were 13 out of the 14 people with sickle trait. And they divide nearly half-and-half between exertional heat illness which is predominantly rhabdomyolysis, and unexplained sudden cardiac death, six cases.

In the non-S group, you have about seven cases of heat illness, and the predominant syndrome is heat stroke rather than rhabdo, but there is a combination in many of the cases of both. And then if you look at deaths attributed to pre-existing disease, there was only 1 with trait that had underlying silent heart disease, there were 11 without trait, and there were 2 deaths from Berry aneurysms.

So, first of all, if you look at sickle trait as a possible risk factor for explained sudden cardiac death, it's not significant. The relative risk was 2, but if you

look at the 95 percent confidence interval, not very convincing, and the p-value is not significant. So, it's not a risk factor in this study for that type of death.

But it is a rather large risk factor for a death unexplained by pre-existing disease, based on the 13 cases, relative risk was 30, and now the p-value is significant and the confidence interval is pretty strong, the lower limit being 11. That was a big surprise. I was expecting to see something like the data on the first slide.

Subsequently, we've been able to confirm this in other populations. I wish someone else had done this, but no one else has really. We looked at all the recruits in the data I just showed you in the top line, and the second line shows all recruits from '82 to '86. The risk factor has fallen from 30 to 11.5, and I'm going to explain that later -- it's very interesting -- in response to recommendations that we made.

And if you look at the Navy as represented by Wagner and our data, it's been pretty consistent from '73 to '86, the risk has been at 35. So, during the time period when the

risk fell for the whole armed forces -- really, mainly, the Army and Air Force -- the Navy stayed at the same level, didn't change, and that's significant. I'll explain that later. And then there's a paper review in the Air Force that shows about a 23-fold relative risk.

The total -- we now have about 100,000 recruits with sickle trait versus 22 deaths in 100,000 recruits with sickle trait -- and that's shown on the bottom -- versus 12 among 1.1 million without hemoglobin-S, and that comes from my paper and seminars. Unfortunately, there's a typo that "rate" that's 181 should be about 125, I believe. And, anyway, the relative risk is correct, the average relative risk overall has been about 21-fold, so it's an enormous association.

Now, this is -- that relative risk is among the black recruits. If you say what was the risk among nonblacks, it would be double, so the average risk would be 42 versus nonblack people. That's because the black recruits are running about twice the sudden death rate of the nonblack. Don't understand the reason for that, but Burke found that, too, in his survey of an

older population.

I'm sorry, his survey wasn't an older population, it included people who had sudden cardiac death at-rest. That was the difference with our data, but Burke was studying Maryland civilians, so it seems to be true in the civilian world as well.

Now, we started to look for features that would associate the sickle trait with a different pathogenesis, and this slide shows that there's an age relationship, an 8-fold increase in death rate with age for the sickle trait group in blue, that's not true of the non-trait group who are in red.

I call them "non-trait", although they are all probably hemoglobin-AA for practical purposes because we didn't screen for A, we just screened for S in some of the population. And I don't have a slide -- okay.

One plausible explanation for an age dependency is the middle panel -- well, this panel that shows on the Y-axis, osmolality of the urine after overnight concentration and, for the AA group, there's no trend with age, it stays flat. For the AS group it's very steep and, by

the time they're in their 20s, the AS group are showing a definite statistically significant deficit in urinary concentrating ability. And then for the sickle cell disease group on the right panel, they are already highly abnormal by age 10, and it's flat after that. But there could be an age-dependency -- and this is the only known physiologic damage that occurs because of sickle trait. It's a renal necrosis in the papilla of the kidneys.

And I don't have a really relevant slide here for this issue, but just to dwell on it briefly, in American -- well, in the black population in general, there's quite a high frequency of this chromosome which are missing one alpha, and that's called alpha-thalassemia because you make less alpha-globin, and that is interesting because, if that was protective -- which it might be because it lowers the amount of S. People who have alpha-thalassemia have less hemoglobin-S. In fact, to be precise, they have less than 35 percent of their hemoglobin as S, which everyone else has more than 35 percent. And the distribution in the New World is about 29 percent. So, 29 percent of Africa-Americans, or

people in the New World coming from Africa, have alpha-thalassemia.

So, we would expect that 29 percent of our cases ought to have alpha-thalassemia, and we can test that. So, I have a collection of 35 cases for which I know the fraction of S. And it turns out that instead of having 29 percent, I've got somewhere between zero and about 10 percent. So, it's about a five- or tenfold protective effect. And I have an abstract of that in the handout. I don't have a slide really showing that.

That provides strong circumstantial evidence that, in fact, sickling is involved in the pathogenesis of the deaths, and suggests that sickling is part of the risk factor.

Now, the next thing I wanted to do is try to understand if there is any kind of relationship between the sudden cardiac deaths and the forms of exertional heat illness, rhabdo and heat stroke, that we were finding, and so I felt I had to know more about heat illness among recruits.

So, I went to Parris Island, which had the best records on this, partly because the

climate is terrible, partly because they have the highest standards for physical performance as a strong tradition there, and also because they've been doing research on heat illness that's very high quality. It's the basis for all of our standards for managing "HOTSOP". And so the records were wonderful.

When I first went there in '85, I could find consecutive cases for about a seven-year span covering nearly 1,000 cases. And since then I've collected another 1500, so we've got more than 2,500 consecutive cases that we're in the process of analyzing for a lot of interesting clinical features of exertional heat illness, and some of these are relevant to the deaths. And so this is our basic study.

What I wanted to do first was to see whether unexplained cardiac deaths might be related to heat illness. So I collected all cardiac arrhythmias and all deaths in this population of about 275,000 young people, mostly recruits, and I included cadre in the same age span, 17 to 30 years old. And this is what I found.

There were four cases that occurred

during exertional heat stroke. The ones in blue were survivors. They both had an episode of clinically significant v-tach with loss of blood pressure or chest pain, and they survived because they were under medical care at the time this happened. The other two cases had a pretty lengthy period before cardiac resuscitation was attempted, and they died.

And this is one of the cases showing you the arrhythmia which suddenly presented when his temperature went to 108 and he went into shock, with a systolic that was about 40 and no diastolic. And they cooled him -- I wouldn't have done this myself -- but they just cooled him with ice water, and when he got to 104 they converted to sinus rhythm. Very interesting observation.

They didn't have a crash cart readily available and they weren't used to using it, so that's why they used that, I guess.

Then there were four other cases of people who basically collapsed during or just after exercise, and died. Their first defibrillation was probably between 12 and 20 minutes after collapse, and we now know that's a

bit long.

The three that are in black all had substantial underlying heart disease. Case No. 6 was quite confusing because he had some scars on his heart and significant underlying heart disease, but he also had a potassium of 24 and a bicarb of 1.5, a very elevated LDH and CK, so he probably also had exertional rhabdomyolysis occurring along with his heart disease. I classified him as basically due to heart disease to avoid bias toward the hypothesis I was looking for.

And case No. 8 was the only one who had unexplained cardiac death. So, that's the weakness of the study. The denominator, as you'll see, is kind of small, but I have an answer to that objection. So, this is how at one point we analyzed the study.

I now prefer not to go through the analysis of person-years of exposure because there are a lot of ways you could criticize that. If you just looked at incidence -- and I have a handout with an abstract that gives you the incidence of cases -- this ratio is about 7,000. And it certainly, at the very least, if you look

at the confidence intervals that approach each other for these two, it's at least 500-fold.

And so the risk is very much higher with heat stroke in this group of 157 who had heat stroke versus those without heat illness, for having an exercise-related life-threatening arrhythmia which is not explained by pre-existing disease. And if you go a little further and say, how do you know which cases are heat stroke and how do you know which cases had significant heart disease, you're inferring it from an autopsy that might be wrong -- it's true, it could be wrong. You could change those figures to 4 out of about 1500 total exertional heat cases versus 4 cases with sudden cardiac death, out of 275,000 without, and the ratio is still greater than 100.

So, it's more than a hundred-fold increased risk of a life-threatening or fatal cardia arrhythmia when you're having heat illness, and it's probably basically due to heat stroke. Possibly, in rare cases, due to rhabdo. I know of a case that demonstrates that.

This is plausible. There is a major increase in bloodflow to skin and muscles during heat exposure. And there are other changes that

make that plausible.

So, these are the main conclusions. Heat stroke was associated with at least 50 percent of the life-threatening or fatal arrythmia in this study, which is rather small. The risk of serious arrythmia without heart disease increased several hundred- or several thousand-fold. During the brief febrile period of heat stroke at Parris Island cases are treated quickly, and most of them are febrile for less than an hour.

There's a causal relation between heat illness and arrythmia which is plausible -- cardiac work, exercise, changes in metabolism, potassium leak that can occur during work, et cetera.

Milder heat illness doesn't seem to contribute to this risk. It's hard to say anything about severe rhabdo because we didn't have many cases, but I know of a case in the literature that was sent to me that does clearly demonstrate this, in which someone got to a potassium of 7 with peak T-waves 20 minutes after doing an exercise for fireman training early in his training as a cadet.

This risk was independent of sickle trait, you will notice. There were no cases that had sickle trait, and the reason behind that is the risk I was talking about, 23-fold with sickle trait, means that you get about one death per 5,500 with sickle trait, and we only had 4,500. We didn't reach that number and, even if we had, you've got to be about two- or three-fold above it to reliably see a death. So, this is a more important clinical problem really, it affects all recruits.

Our recommendations based on this is that when you see a young adult with exertional arrythmia, as applies to most of our troops, you want to do a rectal temperature on all patients. The risk of arrythmia from that is minimal. You want to get blood and urine tests for rhabdo, especially to exclude hyperkalemia and acidosis that could be in themselves fatal if unrecognized.

When you treat patients with arrythmia and heat stroke, don't delay ACLS. Go ahead and go through the ACLS routine. If people are less than 35 and have no history of angina, it's best to use ice water. If they are above 35 or they

have a history of angina, it's best to only use tepid water because we know that diseased coronary arteries can go into spasm when the skin becomes cold with ice water.

If you have a fatality and you're trying to investigate it, you can obtain a rectal temperature. You can reliably determine the temperature at time of death for quite a long time after death, certainly 12 hours. You can screen for rhabdo. If you can't get blood and urine, you can get vitreous humor chemistries, and you can assess the risk of exertional heat illness in some ways that I'll show you.

The second thing we did was look at the -- just studying rates of heat illness as a function of temperature exposure, and we're looking now at other factors I'll show you briefly.

You're all familiar with the "wet bulb globe temperature index", which is a good physiologic measure of heat stress in man because it correlates linearly with sweat rates in moderate exercise, and that's traditionally what we use to measure the environmental heat stress especially in humid environments such as Parris

Island. And this shows you the percentage of days in each month with hot weather using the color code that the Marines use -- black for very hot, then red, yellow, green, and blue. And not surprisingly, the rates of heat illness -- and I think when you look at my slide, you can kind of ignore the females because they're 11 percent. I think the males are more representative. This is about 1500 cases. And I'm sure in the cases per thousand person-months, and you can see that June, July and August are the big months, just as you'd expect. This was just published in April. And that shows the annual variance, which is much higher for the females than the males because the females are only about 100 cases, 150 cases.

And this shows a typical day at Parris Island. At 6:00 a.m., you are down to about your nadir of the WBGT on the top, and that goes up very steeply in the morning. And here most of the cases are occurring between 6:30 and 9:00 o'clock, and I'll show you why that happens.

What happens is they have to exercise before the WBGT gets too high and prevents them from exercising, but they've got to have light so

that people don't trip and have injuries, and they've got to have the medical clinical staffed and open. So that means they can't start until 6:30 in the morning. I know that the Drill Instructors would love to start at 5:00, maybe even 4:00, they'd have more fun with that, but they have to wait for the medical clinics. So, at 6:30 they start doing the stretching exercises, and nobody much is injured by that.

But in the period between 7:00 and 9:00, they do their middle-distance running, and that's the major conditioning exercise currently, since about the mid-'70s in the military, and that accounts for about 70 percent of the heat illness because that's the highest MET activity, the highest metabolic rate activity they get into.

And there's another little peak between 1400 and 1600 hours that's maybe 15 percent of the cases. But since we understand the peak between 7:00 and 9:00 and it's more dramatic, we analyze that as being a rational thing to look at.

Another thing I'll show you that's interesting is that there were no female

hospitalizations. That's because our data strongly emphasizes what had been anecdotal in the literature before, that women hardly ever get heat stroke, in the military recruit training setting at least. We had 157 cases, none of them were women. If women had the same rate as men, we should have had 18 cases. I don't know whether this is because the women don't run as far, or whether it's because of biological differences. I think it's probably a mixture of both, probably women are stronger and they aren't pushed as hard.

And this shows you -- the blue bars are more important than the yellow line. The blue bars show you the case rates per unit time -- it's 100,000 person-hours of exposure. The X-axis is the WBGT category, and you can see that as you start from 60 and you go up, the bars go up. And they are significantly higher at 65. That was a surprise for me. At 70, they're about three-fold the baseline risk and, at 75 you're at 15 times the baseline risk.

The scale on the Y-axis goes up to 6, and the yellow just is the count, the number of cases. And because the Marines follow the

regulations very strictly, there are very few exposures above 85 degrees, and so that last bar is rather unstable. It's based on ten cases. And there are no cases occurring at 88 and 90 degrees, and that's partly because of regulations.

Now, if you look at the day before WBGT, what you find is that there is -- according to regulation, we don't consider the day before WBGT. We don't consider that an exposure. But it seemed to me, from the deaths, that that might have been a factor that played a role, and so I was looking at it in these heat cases.

And now you see that the bars go way up to the 85-88 category, and they stay high going through 90 degrees. So the day before exposure is quite significant. Not only that, the Y-axis here is twice the Y-axis on the other chart. It goes up to a rate of 12. And, again, at 75 degrees, you're 15 times the risk that you have at baseline, at 60 degrees and less.

So, one of the things this is telling us is that exposure the day before is very important. And it turns out about two-thirds of the cases that are occurring in the Marines now,

the temperature at the time they ran was less than 75, but the temperature the day before was greater than 75. About 20 percent, the temperature the same day was 75 or higher.

So, most of their cases, two-thirds of them, are occurring because of an exposure the day before, one-fifth are occurring because of exposure today, right now, and the remainder are a mixture of both things. So, there's a very important effect of the prior day.

And one of the surprising -- I don't have a slide of this, but we analyzed it by day of the week, I would have thought that Monday you wouldn't see this effect because Sunday the recruits are off, they can do what they want, although a lot of them do participate in sports, we didn't see any effect. The Monday rate was just as high for this important factor. I think it needs to be taken into account in handling heat illness better in the future. And this turns out to be a very important slide as far as unexplained deaths.

I'm going to just skip over these other slides, we can come back to them if we have time later.

So this recaps our sudden deaths -- I'm turning back to them. On the top line is what we see in the literature, with the great majority, 87 percent, are cardiac explained deaths -- silent cardiac disease. In the study I showed you already, only a third of them were cardiac explained. The great majority were cardiac unexplained and heat illness, which were about equal, and then that study went through '81.

And then we made some recommendations which changed the practice from '82 to '90, and now you see a shift where more of the cases are cardiac explained, but still less than two-thirds, and a large percentage, about a third of them are cardiac unexplained or heat illness, and what happened is shown here.

We told the Surgeon General's Office that our hunch was that what was going on was poor compliance with the spirit of the HOTSOP measures which protect you from heat and also rhabdomyolysis, also excessive muscle use and conditioning and, as a result, there was a major change in policy, which included enforcement of the flag adjustments for WBGT on-site instead of

measuring it at the preventive medicine place on the hill underneath the trees, they measured it out in the swamp where the recruits were marching or doing whatever they were doing, and they did measurements frequently, every half-hour probably.

So they also forced hydration. Instead of saying, well, now you can drink this nasty stuff in your canteen, they make them empty the stuff in the canteen and, believe me, it's horrible to drink that stuff in the canteen. And also they made allowances for clothing appropriate to weather, which really hadn't been done much before that.

So, now a lot of the high MET activities are occurring in hottish weather and in the summer, in clothing that's sensible for doing that. We're allowed to do our PFTs in running clothes. And those kind of measures are very important.

As a result of this, there were no deaths in basic training in the Army, which was not screening at all for sickle trait in the 11 (sic) years from 1982 to 1991. And by the way, from that data I got that denominator that I

wanted. There were eight unexplained cardiac deaths out of 2.3 million Army recruits in the time period that we were surveying, and that turned out to be the same rate as the denominator from the one case in the Parris Island study. That was one of the limitations of that study. So we know that the denominator is a pretty sensible one for that study.

So, in the Air Force also there were no deaths, and the Air Force also adopted our policy. So those two services adopted our policy and there were no deaths with sickle trait. I know the Army had about 2.8 million recruits go through. My original study with 14 sickle trait deaths covered 2 million. So, you've gone from 14 to none. And I don't know the size of the Air Force compared to the Army off the top of my head, but I think it's probably at least 50 percent. So, somewhere over 3 million people went through training, and no people with sickle trait died in that time period.

Now we've got a problem because in '93 and '94 I know that there were at least three Army deaths of recruits with sickle trait, and there were four deaths in the Air Force at least,

and I've heard rumors -- I haven't heard directly from the Navy -- but I've heard rumors there were a few in the Navy. So something has changed in our training in the recent years.

I've not been in touch with the training data since about '92, with the process of transitioning out of the Army into the civilian world.

There's a substantial reduction in mortality from exertional heat illness and from cardiac arrest without pre-existing disease that accompanies the disappearance of the sickle trait cases further suggestion that they are related events. So we believe that risk can be adequately reduced without specific identification or special treatment of those with sickle trait. Does that statement make sense?

Well, it turns out that to identify exertional heat illness and arrythmia, you don't need to know a person's hemoglobin, and to treat them you don't need to know their hemoglobin. So the sickle trait identification is just a risk factor that doesn't enter into we don't know how to manage them differently, so it doesn't enter into the medical management at all. And I think

that we're in a situation which is not uncommon in medicine, where we have a screening process that doesn't affect the clinical outcome and, therefore, it's a waste of money to do that clinical screening. A good example of that is we don't generally screen for lung cancer among smokers because big studies have shown no benefit. We aren't picking up cases earlier and preventing deaths from lung cancer, so we don't do that.

In this case, I don't think screening has ever helped us to prevent a case of death with sickle trait. The one thing I can imagine that it would be helpful for would be if it increased the motivation of the particular recruit to take those measures more seriously, but most of the things recruits do are forced upon them and can be imposed from without. So I don't think there's a strong argument that screening for sickle trait is going to reduce the death rate.

The data from the Army showed that we had zero deaths in that time period of 11 years and, during that time, the Navy had a death rate, unexplained exercise-related death rate, that was

35-fold higher among those who had sickle trait than among those who did not. And the Navy was screening. So I think it's something other than screening, it's probably management of heat illness.

We've now collected -- depending on how I analyze it -- between 93 and 96 recruit deaths from '79 to '90 and, if you look at the breakdown here, this shows you 20 percent for heat illness and, of those, half of them are red bars who had sickle trait, unexplained cardiac deaths about 25, and 7 of them had sickle trait; explained cardiac deaths 43, of which 2 had sickle trait, and explained noncardiac deaths were 6.

And then the next thing I wanted to do was try to understand the unexplained cardiac deaths. Most of them are related to morning runs during the summer months when the early morning WBGT was less than 75, and there's no significant heat exposure by usual standards but, obviously, by the standard of our recent study, there might be an exposure to a day before effect, and I was interested in looking at that. So this is a look at the day before effect.

But I'll skip this slide and I'll go to a modern slide that's a little better. This slide is a little better. And you have data on one of the handouts here.

Now we've divided them into controls which consist of sudden cardiac deaths at-rest, and the other control group was exercise-related deaths that are noncardiac, such as Berry aneurysm. And there's 17 in the control group.

The next group are cardiac explained death with silent cardiac disease and not having hemoglobin-S, and the group after that -- and that's about 40 percent. And if you look at cardiac unexplained deaths, they are running about 54 percent, had an exposure the day before to a high WBGT. And you can see the trend.

As you go to heat illness, you get up to about 65 percent, and the groups with sickle trait are always a little bit higher than their paired group that doesn't have sickle trait. And I'll show you the actual numbers here. Eleven percent of the controls, without hemoglobin-S -- there are 17 of those -- had this heat exposure, so I guess that's the random rate that you get even if the heat exposure is not related to your

death.

Forty percent among the cardiac explained without S suggests that in that group maybe 30 percent of the deaths were due to unrecognized heat illness. So maybe there's a preventable component of the cardiac silent deaths that occur.

And the cardiac unexplained deaths, 54 percent -- n equals 15 -- and if you compare that with the heat illness, it's not much higher. The heat illness, actually recognized heat illness group, is 65 percent versus 54 percent, not much difference. And the sickle trait group are consistently in the highest level, 75 percent among the heat illness and sickle trait.

So the next slide shows you for sickle trait. We're comparing the proven, the grey hatch, and the solid grey are the inferred from the prior day WBGT, and the lower bars the sickle trait, 90 percent, or 17 out of 19 cases, had either proven or inferred heat illness, and the difference of each component and the sum are highly significant above that for the recruits without sickle trait, at a p-value of .02, or something like that.

So we concluded that increased mortality and exercise with sickle trait can largely be avoided by programs which reduce the incidence of mortality of exertional heat illness, heat stroke, and rhabdo. These programs ensure sensible hydration, rest, loose clothing, relief from the sun as the WBGT increases, and limit the intensity of exercise to sensible levels.

The early identification and treatment of cases is important. One of the things that Parris Island showed us is that it's a rather small island and they have some strict measures in place during the hot season. Whenever a recruit stops exercising, the first thing they do is throw cold water on him. They feel that that discourages malingering -- I'm sure ice water does discourage malingering -- and it can facilitate treatment. Then they get a temperature immediately, and within five minutes, three minutes, they have them in a truck, and the truck gets to the branch clinic on this small island within five minutes, so they're actually under the care of a nurse and doctor within about five minutes for 95 percent of their cases.

There's a small number of people who are doing things out in the swampy part of the island that don't come in early, maybe 5 percent of their cases, and that's been incredibly effective. They've had no deaths from the normal heat stroke syndrome, they really just have sudden cardiac deaths as the only thing they are not eliminating.

The measures that are taken are the same for members without sickle cell trait, and will reduce the incidence of unexplained cardiac death among all recruits, regardless of hemoglobin type. So the measures that we advocate are going to help everybody, not just the 1.7 percent who have sickle trait.

The major clinical features of the exercise-related illness mainly related to competitive middle-distance running, or sometimes other forms of exercise that produce 10-to-14 times your basic metabolic rate. Digging trenches is another activity that can get up to that level. Occasionally, obstacle courses, although they tend to be rather short. And the activity has to go on for usually 5-to-25 minutes.

Often the cases are in early training before the victim is fully conditioned. There is some element of lack of acclimation to heat and some element of poor muscular conditioning -- and I characterize the effort as for that individual's level of experience, the effort is usually heroic that results in death. It's seldom something that they are comfortable with.

The age distribution is mainly 17 to 24 years, and I only had two cases of over-30. I now have two other nonfatal cases over 30. So, occasionally, they do occur over 30, but it's pretty rare.

Of the military cases I've collected, 51 military cases, 39 of them were in recruit basic training, only 5 in regular military career, and 7 in other schools. And what that suggests is that maybe the susceptible people are removed from the military by either death or medical discharge. The other possibility is that it has a lot to do with conditioning, and that military people actually do maintain some degree of conditioning for middle distance running in order to do well on their PFTs.

There are only eight cases among

civilians, so it's much rarer reported among civilian athletes, and these are mostly athletes and trainees for fire and police departments. And I probably know of three or four other cases that haven't been published, but the total is still less than 15, so it's much less common in the civilian world than in recruit training. And I think I'll stop at that point.

CHAIRMAN FLETCHER: Thank you very much, Dr. Kark. We appreciate your sharing your wealth of experience on this, and we have an enormous stack of things you have written. We won't got any further than your presentation from the standpoint of didactics.

We would like to have -- keep in mind when we are asking questions and thinking through this, our task is to respond to Department of Defense, should we screen in the military routinely for sickle cell trait, and that's the question we have to answer. So, are there questions or comments for Dr. Kark? Mike?

LT COL. PARKINSON: Yes. You've presented a wealth of information, and as someone who has dealt with this since it's popped up again in the Air Force, as you noted, what is

needed to argue for no screening is a very hard-hitting, convincing, brief epidemiological point paper, and I have a hard time believing, even being an epidemiological officer through all of this, I would just ask, as we put together this package, I think it will have to be a convincing package to support an AFEB recommendation or nonrecommendation of nonscreening because what jumps out to four star commanders is a 20-, 30-fold relative risk, low absolute risk, for the onesies, twosies, threesies, at a time when every single case or near-to-it gets on the front page of the newspaper.

So, again, if what we're talking about here is risk communication and translation of good epidemiology and common sense principles about screening, why it doesn't work, throughout all of this and even if you take all your slides, it would take quite some time to make that convincing argument. And I would just ask your assistance as we move downstream of this because, short of that, I think in terms of making a policy recommendation on this is going to be very difficult.

DR. KARK: Your criticism is apt.

LT COL. PARKINSON: It's not a criticism.

DR. KARK: I had a short time, and I was aware that I needed a shorter summary of this thing with bullet sort of format, but didn't really get to it.

I think if I had to say what the essential arguments are, first of all, that there's a lot of evidence that most of the deaths, even the cardiac deaths with sickle trait, are under circumstances where exertional heat illness is the major cause of death.

So, the excess risk of death for sickle trait is fundamentally with exertional heat illness. And we know already that methods are very effective for preventing exertional heat illness among those with sickle trait as well as those without.

What we found is that if you enforce the spirit of that approach, that we have experience with over 3 million recruits who went through training without any sickle trait deaths, at least 50,000 people with sickle trait went through Army and Air Force training without deaths, following that policy.

Since we know that sickle trait is not used to provide us with a difference in diagnosis or a difference in management, it doesn't affect the clinical course of the patient to know that they have sickle trait. It has no effect on the clinical course.

And we know that the outcome can be very good in a large population who are not screened, 2.8 million Army recruits, that's a strong argument that we don't need this expensive screening process to prevent this mortality, substantially prevent this mortality.

So that would be my argument, and I'd be delighted to write up a one-page bullet format of that and get it to you people at the end of the day.

CHAIRMAN FLETCHER: That would be good. Dr. Chin?

DR. CHIN: Could I just get sort of an update summary as to what has been the policy, and I see something that we just received of this policy is effective October 1, 1995, that would be screening for sickle cell. Is the question that this is the current policy and there are questions as to whether that policy should

continue? I don't know exactly where we're at with regard to policy.

COL. FOGELMAN: This is just a recommended -- the recommendation --

DR. CHIN: What is the current policy?

COL. FOGELMAN: Each service --

LT COL. PARKINSON: There is a DOD policy that is supposed to be --

COL. FOGELMAN: Okay.

CHAIRMAN FLETCHER: It's different between the services. I believe it's different in the Air Force.

LT COL. PARKINSON: The DOD policy is, to start with, one to screen for elements --

CHAIRMAN FLETCHER: Dr. Poland.

DR. POLAND: One question I had was, Dr. Kark, with the data you showed that was interesting in a pretty controlled environment that the recruits are in. What happens past that?

DR. KARK: I alluded to that. Basically, harder to get accurate measurements of the population exposed and to know that you have all the cases but, for the Army, the Army has a tighter relationship with the AFIP for historical

reasons. So, most sudden deaths in the Army get reviewed by the AFIP, probably over 95 percent of sudden deaths, and certainly a sudden death in exercise would be sent routinely to the AFIP. And now, especially with the Medical Examiner's Office in place there for the last five years, that's been a big improvement.

So I think that I have very accurate data for the Army, and less reliable for the other services. I calculated, in the article on hemoglobin -- what's it called -- Exercise and Hemoglobin-S, in the seminars, I have a calculation in there. We had only found something like five cases, fatal cases in people past recruit training. And actually some of those were in AIT, advanced training right after recruit training. And when you calculate the numbers of people who should have been on active duty, it's at least a hundred-fold reduction in that list. So, basically, the risk has gone back to the same level as almost for hemoglobin-A, very close to that.

So, there's a major reduction in risk once you finish recruit training. The two possible interpretations, I don't know how to

separate them. One is that there's a susceptible population, some marker we don't know about, that's additional that's required besides trait in order for this to happen, and you've eliminated most of those people by whatever happens in recruit training, either death or medical discharge.

The other possibility is that it has a lot to do with being unconditioned physically and unacclimated to heat and doing middle-distance runs, or equivalent activity, and that people in the military generally keep themselves in reasonable shape. I don't know whether that statement is true or not, but in recent years where retention is more competitive, people are probably taking the PFTs pretty seriously. So, I imagine it's a mixture of both, but I don't really know the answer.

DR. CHIN: It's still not clear to me what is the question in the sense that I see this -- it doesn't have a date on it -- Sickle Cell Testing Policy, and I see in the right-hand corner it says Proposed Screening Policy. But the way I read the bottom is this policy is effective October 1, 1995. So, this was never

put in? What is the current policy, and what is the current practice, and are we trying to overturn something, are we trying to -- you know, what is the question to the Board?

CHAIRMAN FLETCHER: The Air Force has a specific policy, right, Col. Parkinson?

LT COL. PARKINSON: Right. What we have done, there is a regulation that basically states that the services should be doing sickle trait screening, and the question then is, in the case of the Air Force, to come up with the onesie-twosie deaths that occur. And what they want to do is to move that screening from the site of initial basic training back to the military processing stations, and that's going to make that uniform for all the services.

To my knowledge, the Army is not now doing that screening. The Air Force has been doing it and the Navy has been doing it. But even though it may be DOD policy, it's not being uniformly implemented. And as these deaths occurred, it reraised this whole issue which has been looked at periodically from time to time.

DR. KARK: I have been following this since 1973 and, basically, the Army has never

officially screened all recruits. But Ft. Bliss had that first experience in 1968-69 and, since then, they were screening up until probably about five years ago. Four or five years ago they stopped screening.

So, since then certainly, and during most of that time, most of the Army recruit centers were not doing any screening, but screening has been in place since '73 to the present for the other components of the military. And that major attempt to change the policy occurred about a year ago. They had a sickle cell working group, which included myself, and I thought they were inattentive to the medical data that were presented to them, but that's -- you know, I have a biased view, obviously -- but that policy was never adopted by the Army. The Army is still opposing it for reasons that seem rational to me.

CHAIRMAN FLETCHER: David.

CAPT. TRUMP: In the Navy and the Marine Corps, we do screen for sickle cell trait at recruit training. At Great Lakes, over about 39 months, 91,000 recruits were tested for sickle cell trait, and we found that 5 percent of those

were sickle cell positive. And they did identify 37 recruits, which is 1 in 2,500, with just qualifying hemoglobin. Had we known that in entrance processing that they had that condition, they would not have been even sent to boot camp.

In fact, the one death we had last year at Great Lakes was a young woman recruit who was found to have sickle cell trait positive. They did a hemoglobin electrophoresis on her. She had a sickle cell thalassemia, beta-thal. She was in a holding company and getting ready to be sent home, and she had a fatal sickle crisis and died.

I think the issue is, as Dr. Kark pointed out, from the policy prevention standpoint, the thing we do to prevent all deaths is to keep injury prevention program. The screening program, in and of itself, certainly is not a measure to prevent deaths in our recruits. I think it's really an issue of policy.

I was on a working group last year internally within the Pentagon that was trying to look at this, and it's a contentious issue about whether we should continue screening, allow the

services to do their different things, whether we should screen as they come to our recruit training centers, or whether the screening should be moved. There's a whole bunch of issues as far as recruiting, and also issues as far as what you do with the information once you know that someone is sickle cell trait positive.

CHAIRMAN FLETCHER: Before we move on, the answer is from the Air Force and the Navy, and the Army has no routine screening.

DR. KARK: That's correct.

CHAIRMAN FLETCHER: And the question, just to clarify, of Dr. Joseph is, should we maintain a uniform policy, that's our question -- a uniform overall policy is our question. We don't have to state that, but I think --

DR. BAGBY: And if so, when it should occur, he says.

CHAIRMAN FLETCHER: Excuse me, Dr. Bagby?

DR. BAGBY: He says, please review and make recommendations on whether testing should occur for all accessions and, if so, when it should occur.

CHAIRMAN FLETCHER: Trying to set it

more uniform, if possible. Dr. Gwaltney?

DR. GWALTNEY: I have the same question. What in the policy has to do with the information once it is acquired? What then is the policy, say, once the information is available?

CHAIRMAN FLETCHER: Bill?

DR. SCHAFFNER: I guess my comment is similar at the moment. Among the services who screen, what do you do when you find a positive, when you have a clear statement about that? I'm still confused about that.

CHAIRMAN FLETCHER: Air Force?

LT COL. PARKINSON: Let me just say that I have been personally uncomfortable with what we're doing oftentimes, but the reaction was to have a screening program. We've been having it. And basically, is that the individual with sickle cell trait, just as the G6BD (phonetic) is counseled concerning the nature of that condition, et cetera.

Now, G6BD is hard enough, but sickle cell trait, how you counsel somebody about that in terms of what it means and the nuances between relative risk, absolute risk, the background

rates -- and we have not, to my knowledge -- you know, we have some information I believe we hand out, but it is not in layperson-friendly language as it relates to this.

So, certainly the screening is problematic for all the reasons we talked about. But I would also say, to append my earlier comments, I think we also have realize that since heat-related illness has become almost a death knell for any commander who is associated with that type of training, I think that it's very important in whatever comes forward to acknowledge that, everything else being equal, that sickle cell trait positive individuals even related to the same degree -- correct me if I'm wrong -- to the same degree of heat-related exertion or stress, do have an increased risk relative to nonSCT-positive people for the physiologic reasons, like you said, because I do think that in the Air Force cases we have looked very hard at the relationship for training rules violator, et cetera, et cetera, et cetera.

And I don't know that you can say, or even imply, in documentation that any heat-related illness ius equal to a breach in training

standards or things like that. And I guess I just want to sensitize the Board and everybody to this because the good side of the progress we've made since '73 is sensitizing the training community to having protocols and procedures to prevent heat-related illness.

The bad side is if the statement comes out that, well, we could pretty much prevent all these by control, the implication there is that there is poor or inadequate, which is something that we think already, we could not determine that we did that.

So, I would just, again, think about the flip side of that type of thing, but I didn't get your comment -- you know, risk communication is a very difficult thing all the time, particularly in this case, and we're probably not doing as good a job as we could or should.

CHAIRMAN FLETCHER: You have five more minutes. Dr. Kark, do you have any comments or questions?

DR. KARK: Historically, Congress has clearly stated where it stands. Sometimes the politicians aren't that interested in the medical issues. They've stated pretty clearly repeatedly

that they want sickle trait individuals to have the same career as everyone else, and I think that policy has been very firm, especially since, I think, '85 when they opened up the pilot career field to sickle trait. It turns out medically this is a pretty sensible decision fortunately. There's no real conflict, I don't think, because the risk is at such a low absolute level.

The major risk for recruits coming in is that in the first year they are going to die of a motor vehicle accident. That is probably 90 percent or more of their deaths. If they don't come in, the major risk of death is violent trauma or motor vehicle accident or violence, and that, again -- those risks are so much higher than the absolute risk of this exercise problem, that it's really hard to say that they really need to be counseled about that risk even.

And I'm not a strong advocate of -- counseling is complicated, as you pointed out. It's complicated, and then the absolute level of risk is quite low, although the relative risk is high.

LT COL. PARKINSON: I'm not saying

it's complicated epidemiologically.

DR. KARK: And then the other thing that is a barrier, I think it's a bit of a barrier if the command feels that if a death is attributed to heat illness, that automatically means that they've failed and they get booted out. I think that's a frightening set of circumstances because that motivates them to conceal the fact that heat illness occurred, if they possibly can. and I think that is definitely wrong.

There certainly are cases that I've studied where nobody did anything wrong and it just happens. Sometimes it just happens. People can have heat illness on their own.

CHAIRMAN FLETCHER: One last question or comment. Dr. Stevens?

DR. STEVENS: Would you say again the numbers or the percent of individuals found to have a hemoglobin disease or configuration that would exclude them from the services you found?

CAPT. TRUMP: It was 1 in 2,500, 37 out of --

DR. STEVENS: That were not otherwise known.

CAPT. TRUMP: Right.

CHAIRMAN FLETCHER: Dr. Broome?

DR. BROOME: It seems to me that it would be very helpful to clarify a comment that LtCol. Parkinson made and try to dissect out from Dr. Kark's presentation, and that is, what is the relative risk for those with sickle trait at the different levels of exertion, particularly relative risk at levels that actually are acceptable. You know, is this something that is a consistent risk even if you are maintaining the standard, or is this something that really just occurs when you are outside recommended exertion levels? I mean, that's really a fundamental issue.

DR. KARK: Well, what I showed you about the day before exposure is not considered routinely by any medical group, and it certainly isn't in our regulations. And what we found was that at the current time about two-thirds of heat illness that occurred in recruits, occurred probably because of day before exposure.

The death is the same thing. The great majority of the deaths, sudden cardiac deaths and heat illness are from day before

exposure.

LT COL. PARKINSON: But the day before exposure was still within the training limits, or did they exceed, because assuming that our policy is consistent from day to day --

DR. KARK: It's not a consideration. I mean, you could be at 90 degrees the day before. If you are at 70 degrees now, you can run. It's not a consideration.

LT COL. PARKINSON: But I'm saying on the day before they did not violate the training regulations at Parris Island --

DR. KARK: No, they didn't.

LT COL. PARKINSON: So, in that sense, it was still within our training parameters, which is Dr. Broome's question.

DR. KARK: I don't think anyone is making a mistake. The other side of it is that the WBGT regulations which show up in marching because the time is controlled in the 50s and 60s, 90 percent of the time you qualify for the marching. Make sure you run one for the whole training session. Nowadays, we're all running, and that's -- just a portion of that will run 50 to 70 minutes. So we're dealing with a much more

metabolic activity and actual conditions are set too high. I think that would help us in dealing with the situation.

LT COL. PARKINSON: Now that is an issue -- if there is good evidence for that based on this other thing, then I think that is a major thing that has to be part of this package as well. If, indeed, the main standard that we're using to train, as evidenced by the exposure data you got from the day before, which are in our training standards, are not adequate, then that is something which, again, would lead me to our observation that these people did not violate our existing training regulations nevertheless are having deaths, and people have a relative risk of 20 times of that sickle cell trait, that's what the training commander of the Air Force says, what can I do when it comes to a screening program. But if, indeed, there is evidence that the training standards need to be changed, then I think we can address that, too.

CHAIRMAN FLETCHER: Dr. Luepker had a question.

DR. LUEPKER: Yes, just a quick question of Dr. Kark. You seem to imply, and I

just want to be sure I heard it correctly, that this problem was relatively prescient but recently there has been an upswing in cases. Does that mean totally, or otherwise?

DR. KARK: Yes, absolutely.

CHAIRMAN FLETCHER: Use the mike.

DR. KARK: We've been following this closely since 1981, and I was very surprised that our recommendations we made in the Spring of '82, first of all, were put into effect immediately and affected the hot season of '82. And, second, they were really put into effect. It was just really dramatic.

We had no deaths in the Air Force and Army that formally went along with that policy for the next 11 years, going through '92, with sickle trait. No people with sickle trait died in recruit training.

Something has happened differently, I feel, because all three services -- I'm sure the Air Force and Army have had some deaths of people with sickle trait in '93 and '94, probably a total of around five or six people, and I'm less certain about the Navy, but there's been a change.

CAPT. TRUMP: We have no information on that. For the working group at the Pentagon last year, that was looked at least in the Navy and Marine Corps, in the previous five years and now six years. We are not aware of any sickle cell trait related deaths. Like Dr. Kark said, that's partly determined from the surveillance program, without actually going into research.

DR. KARK: You have to do research to get these answers. I followed the Navy up to 1990, and there was a death in '89. I haven't followed since then.

CHAIRMAN FLETCHER: We're running a bit overtime. This has to go into Executive Session, but one last comment from Col. Jones.

COL. JONES: John, I'm sorry I missed much of your presentation, but one of the factors that's preventable, the Navy has related to both heat related sickle cell deaths and other deaths is hydration because cumulative dehydration would explain why heat is related to both fatalities of heat exhaustion and sickle cell crises developing after successive days of heat because you get a cumulative dehydration, so that's another factor that needs to be looked at in that it may not be

the activity they're going through, that they're hot as they're moving through it.

DR. KARK: I guess I agree with you. There's some evidence that you don't have to have a lot of activity in your day before exposure because your Monday morning risk from Sunday's exposure is just as bad as middle of the heat.

So, I agree with you, first of all, that hydration plays a role. And we tried to use some methods of just looking at urine color the first thing in the morning, and anybody who tested dark yellow -- we had a color chart -- we made them drink some extra water. That seemed to make a dramatic change, so there may be a role for further hydration at a first warning.

CHAIRMAN FLETCHER: The last comment/question as we move to the next.

DR. LEE: I was just wondering in your analysis, whether you looked at multiple factors simultaneously, in addition to looking at sickle cell trait results, and whether you could get sickle cell trait and, for example, activities during previous day. I mean, whether you look at several --

DR. KARK: That's a very interesting

point, we're trying to do that. We have that in place for heat illness. We have a database with these 2,500 cases and 200 variables, and we're looking -- we're trying to do that, but we're unfunded. We haven't had funding for the last two or three years.

And we'd like to do the same thing -- I included a very interesting observation from the heat illness in your package. I don't have a slide of it. We found that if you take body mass index, it increases your risk of heat illness about three-fold-plus, and if you take slowness of the run it increases your risk about 3.5. So, the worst quartile in those -- if you take the 18 percent of recruits who have the worst quartile of their body index, meaning they are fat, and they are slow -- they are fat and they are slow -- then their risk is nine-fold higher of having heat illness. And it turns out that population of 18 percent that you can identify in the first day -- this is just looking at the first day of training, initial physical training test day one, and you take those three parameters -- we tested about 20 parameters, and those are the most predictive. You take those, and you can predict

50 percent of the people who are going to have heat illness.

So, it's wonderful to look at multiple variables, and we're hoping that when we apply this to the deaths, we can get a stronger case for what's really going on.

I have a feeling the one other variable that might be very important that we haven't looked at yet will be people that we can tell were unacclimated when they arrived on duty because they came from a cold climate and they weren't exercising before they came in.

And if we can look at these multiple risk factors for the deaths, I think we can pin down what the deaths are to much better, as well as providing a better policy for management of heat illness. But we think that on the first day, people arrive at training, there are some methods you could use that might predict as many as half and maybe more than that, of people who are going to have heat illness, and you could manage them differently.

CHAIRMAN FLETCHER: We will go into Executive Session. Thank you very much, Dr. Kark and others, for input.

Our next is Col. Frank O'Donnell, U.S. Army Medical Corps, who is Commander of the Health Service Directorate of the U.S. Army Surgeon General. Dr. O'Donnell is going into the Joint Endeavor Update regarding, I guess, Frank, the Bosnian situation.

COL. O'DONNELL: Thank you. Good morning. Would you turn on the 35-millimeter projector and go to the first slide.

(Slide)

This is going to be a relatively quick update on events in this part of the world, and I've put the map up just to get us going.

(Slide)

Virtually all of these 35-millimeter slides arrived in our office this week, and I did not take these pictures so my editorial comments and descriptions will be somewhat limited to the third-hand descriptions I got from other folks.

This picture was depicted to give you a flavor for what a small base camp might be like in the Bosnian environment in the middle of winter, obviously. I haven't quite been able to make out what those structures are in the middle of the roadway there, but just not to dwell on

this.

I will discuss some of the preoccupations that were associated from a health standpoint with living conditions for the soldiers. I'm just going to show you a couple of slides of where soldiers and, for that matter, members of other services may be living.

I'd just point out here, an attempt was made to put in a covered or a wooden walkway. The tents are actually up on platforms, not down on the ground or what might be mud, and those are really the two items where a major effort was made to get people out of the mud.

As you may recall from the press early on, there was a lot of water in the environment, sometimes even in locations like this, when the river came up to meet this, so there wasn't much to do.

(Slide)

And that's maybe the same slide.

(Slide)

This is not typical, and it's certainly not representative of the early situation, but when units were able to co-locate with fixed buildings -- that is, permanent

structures -- and when the contractors who were helping with some of the logistics aspects of the operation could get their act together, sometimes the troops would eventually end up with the opportunity to eat in an environment like this. And this is not a slide from January or December, this was taken in April apparently, and eventually they got to the point where troops were able to get at least two what we call Class A meals per day, which is very good.

(Slide)

This is the first of a series of slides to depict one particular episode in which troops were given a place to live that provoked some concerns about the health aspects.

This, I am told, is a coke preparation, a coke production plant, and I don't know much about how one produces coke, but it doesn't look like a very attractive place to live. This is the way it looked before people moved in, and I'd just point out what the ground looks like.

(Slide)

When the contractors got there, apparently one of their chores was to prepare the

site, and that included laying down, I guess, fresher earth and preparing wooden platforms for the tentage, and you can see -- I'm not sure whether those may be permanent structures on the right, they look like it -- but there was site preparation right in the midst of what is otherwise what one would consider a heavy industrial environment.

Tents went up with covers on them. I might add, by the way, that this coke plant was not working at the time, it was simply a location. It had not been operating since the war began.

Eventually, this small tent city was put up and, if I go back, I'd just point out what these tents looked like as they were going up fresh, and then after a couple of months, just the appearance of the tents in terms of the soot contamination of the outside surfaces.

I am told that this contamination actually was not from the coke plant itself, but from nearby coal-burning power plants.

(Slide)

This is the general vicinity around there.

(Slide)

And this is, I gather, one typical stack in the vicinity which was producing power for the community.

(Slide)

I thought this was a nuclear power plant with cooling towers. Apparently this is actually a coal-burning power plant, and they require cooling towers. I don't quite understand the engineering associated with that. So, instead of just warm steam, I guess, emanating from these cooling towers, there probably was the products of combustion of carbon-based compounds.

(Slide)

And apparently coal-burning, as you probably have read from the newspaper accounts, is a very common way of producing energy in that part of the world.

(Slide)

One of the other aspects that was of some concern in terms of setting up places where our soldiers could camp was, of course, basics like is the water any good, or what are the water supplies. This is a slide simply of a foren medicine technician who is sampling water out of

a well that was on a perspective site for our folks to locate.

Generally speaking, in terms of potable water or drinking water, water sources are either rivers or wells, when wells could be found. We generally pass all such waters through reverse osmosis, water purification units, so the product should be pretty pristine in terms of its acceptability or safety for drinking, and it is chlorinated after it is filtered.

(Slide)

These are simply an example of the holding bladders, if you will, which will hold the immediate product of ROPU processing. The larger size bladder are these -- I think these are 30,000 gallon bladders, pretty sturdy -- and if some of this water needs to be transported to outlying base camps or outlying camps, these are the kinds of bladders which are put on vehicles and used to move water supplies around.

One of the points which was made to me by the folks who are over in Europe monitoring this is that despite our concerns about the pollution/contamination of the environment not only from living things, but also inorganic and

organic toxins, is that water supplies generally are protected in this way. That is, we are not draining water directly out of reservoirs and bringing it to the lips. Once produced, it remains essentially in closed containers for practical purposes.

We don't have any slides, but one other novel development in the theater has been I guess you would call it -- it's like a bottling capacity. It's actually following ROPU processing. The Army has purchased a system which will allow us to put water directly into plastic bags, not unlike IV bags in the sense of their feel. And the point was actually to bypass the tremendous expense of bottled water, commercially acquired bottled water, and this is simply the Army way to make our own and save a good deal of money.

The system works, although apparently the real intent of the system is to provide a quart or two of water that's pretty safe, and to use it to refill people's canteens. But we've gotten, unfortunately, into an environment where soldiers at least are very used to getting commercially bottled water and, as you may know,

in the Persian Gulf there were about a zillion liter bottles of bottled water consumed by our folks, and they've kind of gotten into the habit of looking for bottled water. And so they've been using these bags as sort of a substitute and essentially carrying them around.

In reality, what we'd like them to do is simply take the water, which is good, and put it into their canteens, but canteens seem to have descended to a level of less aesthetic pleasingness to many soldiers, and that's really unfortunate.

Someone suggested that if we wanted to be clever, we should make clear plastic canteens so they can actually see that the stuff inside still looks good. And as long as you put it inside the canteen cover, it would not present an operational drawback.

(Slide)

This also relates to the issue of site preparation and actually doing the best you can with perspective sites. This is apparently a crew working on a well. Many of the wells in Bosnia had fallen into disrepair or disuse, and some of them were found to really need a lot of

work in terms of fixing, and that's apparently what's going on here.

(Slide)

This slide, comments were made to me is that occasionally when one is depending upon well water or actually has a distribution system through fixed plumbing, but when the source of water is unreliable, occasionally there are shutdowns of the water supply. And when that happens, sometimes the ability to flush sewage is compromised. In addition, when we move folks into an industrial complex whose sewage lines have a certain capacity and we suddenly put ten or 20 times the number of people on that site using the few available latrines, sometimes we overwhelm the sewage system, and apparently what these folks are doing is simply playing catch-up for a sewage system that's been overloaded. And that apparently is a recurring issue.

(Slide)

Trash, as you can imagine, not only trash we found when we got there, but trash that we may generate -- I think this was all inherited trash -- a significant issue. One of the points made to me by an officer who was telling me about

the situation was that many of these slides were taken for the purposes of documenting what the situation was when we got there because we don't want to have to pay, shall we say, costs when we move out for damage we've done to the environment. We want to be able to delineate what we did and what we found when we got there.

That's apparently an incinerator in the background. I didn't realize it at first because it didn't look very big, but the point of the slide, I guess, is that not only is there incineration going on with the attendant effects on the air that residents may live, but not everything can be incinerated, and I guess this is the metal pile and what's burnable goes in the back.

(Slide)

And petroleum products is the other major concern that we had going into this theater. This was obviously a gas station that was in place. I'll just show you a couple of slides.

The point was made that in many, many, many instances, what we would consider appropriate measures and environmental controls

and administrative controls to make sure the environment is not polluted by POL products, they weren't necessarily being observed before we got there.

(Slide)

This is an underground storage tank, and I don't know if the point was to depict anything in particular, but as many of you may be aware, underground storage tanks are a significant problem in this country and they might well be in that part of the world.

(Slide)

Again, this isn't the way I'd store fuel in my backyard if I was really concerned about the environment.

(Slide)

Now, in our own backyard, that is over there, however, the point was made that when we're using petroleum products, such as diesel fuel for heating our tents, we need to be careful, when it's typically stored outside, that we're not simply doing it in a cavalier manner such that it will pollute our own environment as well as the environment of our host, if you will. Lots of petroleum products of various types are

used, and it's a significant concern.

(Slide)

This, I guess, is rigged up so that if there's any leakage from this device, it will be caught in this bucket.

(Slide)

I just ask you to keep this image in your mind. This is a rash illness. It's pretty dramatic, I think. It kind of reminded me of measles. And I'll come back to that when I go through some of my other slides.

That's the last of the 35-millimeters.

I think you had a briefing on the Joint Endeavor previously, is that right, at the last meeting? Okay.

(Slide)

Here is just a recapitulation of the kinds of issues that were of concern from a medical perspective going into the theater, and I won't dwell on these, but suffice it to say we were concerned about the infectious disease threat. We were also concerned about the noninfectious threat of that environment.

(Slide)

I'm going to try and review for you

just some of -- give you some feedback as to what we found, what the experience has been.

As a representative set of data, here is some outpatient statistics on disease and nonbattle injuries for Task Force Eagle in Bosnia. Essentially, the point to be made here is that we are able to track the incidence of disease and nonbattle injury, and if you want to have some rough sense of what might we expect, what is put up there as the blue bar is kind of what was the typical rate or incidence during the Operation Restore Hope and Uphold Democracy, which were Haiti and Somalia.

So, on this basis, anyhow, to point one, we are able to capture events and, two, so far on a quantitative basis we seem to be doing okay.

(Slide)

This slide simply attempts to depict what were the most common kinds of conditions, very broadly grouped, orthopedic conditions and injuries that are musculoskeletal usually lead the pack, and they are right now.

(Slide)

As you can imagine, that data I showed

in the last two slides are aggregate data, the byproduct of being able to collect data from a number of base camps that are scattered around the theater. And I don't want to dwell on any of these, but you get an idea at the bottom how many base camps are participating in the surveillance system.

(Slide)

This is just one look at some other medical conditions, a breakout. This Steel Castle, the one with the tallest bar there, I must confess, when I got these slides, I didn't get any commentary, so I don't know what's going on there but, again, it sort of makes the point that in the aggregate or when tracking specific disease entities, a surveillance system that's relatively sensitive is able to pick up variations from the theme down to on a geographic basis.

Now, these data are provided to me by the folks from the CHPPM Center for Health Promotion of Preventive Medicine, and I believe it's actually Maj. Sharon Ludwig who is kind of in charge of this -- is that right, Bruce -- and so these come by way of her.

As I say, I don't know what's going on at the Steel Castle, I'll have to ask her that, it sounds interesting.

But, again, to kind of pursue that issue in this case, I have the data, I don't know what the whole story is, but they actually tracked and broke out the Steel Castle data just to demonstrate. Actually, it would appear that all along they've had higher rates than the rest of the group, and things seem to be deteriorating, one would infer, from the way that curve is going.

So, I think it's nice to be able to capture that data, and will permit the people on the ground not only simply to count, but also to dispatch people to look into a problem a little bit more specifically. That was all outpatient data.

(Slide)

These are some data from hospitalizations. And I'm not going to make much comment on this, but we were able to compare hospitalization rates by major ICD-9 categories with the Army's experience overall in the calendar year 1995. And I gather data like this

was kind of the genesis, so apparently there's some media interest in the assertion that it's healthier to be in Bosnia than it is to be back home in the United States, and that's an interesting way of looking at it.

I think what we're really looking at is what someone called the "healthy soldier effect". We only send our healthy folks to Bosnia, so one would expect that their experience with various conditions would be pretty good.

Again, injuries and musculoskeletal conditions are biggies, and continue to be so.

(Slide)

This one is hot off the presses. Maj. Rubitong (phonetic), from the Center for Health Promotion and Preventive Medicine -- they are the agency which is tracking the hospitalization data as it comes through what is called the PARTS system, which I mention in the footnote down there. It's a very good way, and it's electronically based, I guess Maj. Rubitong picks this data from an electronic database which is maintained by the Patient Administration folks.

And this tracks hospitalization rates from week one through June. I'm not sure which

week that is in June, but we're into this month already. And, again, not to belabor the point, but rates are relatively high in the beginning, but have sort of plateaued out and, as we could see from the previous slides, these rates are probably where we want to see them in the sense that they are not excessive. That would be our interpretation of the data. It's a nice capability to be able to track these things.

(Slide)

One specific thing I wanted to describe to you is in previous meetings you've been briefed about the threats of various infectious diseases. One of those was infections by the Hantaa Virus, and there are several strains of that present in the theater. There actually has been at least one case so far of Hantaa Virus infection. It occurred near the end of April. A staff sergeant who came down with the symptoms shown there.

Upon evaluation, he had blood in his urine and protein in his urine, he was febrile, his platelet count was low, and they were able to do the IgM test for Hantaa Virus on the scene in Bosnia, it was positive. They started him on

rhibovirin there, shipped him to Lonstul (phonetic) in Germany for the remainder of his care, which included intensive care, and continuation of the rhibovirin protocol, and he did quite well, and probably returned to Bosnia. I don't actually know that for a fact, but he -- apparently his clinical course went pretty smooth.

You may recall that the ability to use rhibovirin for this disease is under an investigational protocol, so he was interested and he signed up and got the drug and did well, but you can see his creatinine got as high as 4.9. So, he was reasonably ill in that respect.

There was one earlier case which people thought might be Hantaa Virus disease, it was at least compatible, but it did not pan out to be this serologically and clinically I don't think there was ever any compromise of renal function. He was just a pretty sick person with a febrile illness.

The other issue which the Board considered at great length previously was how to proceed with using the tick-borne encephalitis

vaccine. And a decision was made to go ahead and to offer it to those who were deemed to be at highest risk.

I can't tell you from the perspective of those in Bosnia exactly what the criteria were that were used for who was at highest risk, but I can tell you that the decision was made to go ahead and offer the vaccine on the conditions of informed consent, and it's been happening. And as of last week, or the week before, 3700 folks in-theater had received at least one dose, of whom 3100 had actually gotten up to their second dose, and so on. It's been going well.

There was a lot of question and discussion in the AFEB about is it a safe vaccine. Despite a mountain of information which would suggest that it was a pretty safe vaccine, there was a little concern at some anecdotes which suggested maybe it wasn't as safe as we would like it. And so far our experience would appear to be pretty favorable.

There are three individuals who appear to have had any kind of ailment in time related to their receipt of the vaccine shots. That's kind of what the stories are that you see there

on the slide. I don't think anybody was overwhelmed that these would necessarily cause an effect -- that is, the vaccine caused these things. There's always a certain amount of uncertainty. The last one clearly is probably just an episode of migraine.

There was one other soldier who apparently filled out the side effect -- in fact, there was only one soldier who took the trouble to fill out a form that said he had problems after he got the vaccine, but what he reported is that his arm hurt and got a little swollen 24 hours after the shot. In other words, he felt fine, and a little analgesic antipyretic took care of him. So these are three other cases that the surveillance system did pick up as happening in time associated with the vaccine. So, so far, so good.

There have been no cases of TBE detected thus far. We'll keep our fingers crossed. Although the warm season is really just kind of beginning, or just getting up to speed, a briefing presented last week to Health Affairs, there was some comment about observations of ticks, or the operative vector, and apparently

there is no shortage of ticks. It's not as though they are crawling off of our tents or anything, but there was lots of anecdotes suggested, there are ticks in the environment. So, our level of alertness needs to remain high.

You may recall I showed a slide earlier of a person with a rash on their skin. Back in I think it was December of January, some of the units which were preparing to move into Bosnia were plagued by the outbreaks of what we called "rash illness". This did not happen Bosnia, it actually happened in units that were working and moving through Belgium.

It was a source of a great deal of puzzlement, but it was also of some operational significance at the time because there were a couple of engineer units, I believe, whose departure from Belgium and arrival in Bosnia was delayed by a week or two simply by the outbreak of this rash-like illness in their units.

So, it achieved some operational significance at the time. We never did figure out exactly what was happening with these soldiers, it was a very benign ailment. The rash is dramatic to look at, but the people were not

particularly sick, and I'm not sure any of them even got hospitalized. And there were some minor perhaps respiratory symptoms to go along with them.

Well, that kind of went away and we felt, well, that's the end of that. But then in March and April, there was a recurrence, you might say, of rash illness in soldiers who were not going to Bosnia but who were also actually exercising in Belgium. And I just want to give you a little bit of further information.

We really pulled out the stops in terms of looking into it this time, and sent over some folks from the CHPPM, who went over to Europe to help the folks who were already in Europe, the CHPPM Europe, look into it. And I think you've probably got a copy of this with you. I will short-circuit the explanation here.

Suffice it to say, the epidemiologic inquiry was able to get real methodical and detailed information, to include food histories, and kind of sort out who went where and when, and the bottom line is they were able to identify two waves of illness in these exercising units, as you can see -- that wave there, and then a

subsequent wave.

Based upon food histories, they were able actually to incriminate, or felt they might have incriminated these particular meals which are identified with these arrows there, there, and there, and particular dishes. And when they really narrowed it down, they really felt that they came up with pretty conclusive evidence that associated the outbreak of this rash illness amongst people who would consume particular items at a particular meal, a Thursday evening meal, in the same dining facility which is run by Belgians, and they prepare the menu to Belgium specifications. I guess it probably tastes good, but the implications of this inquiry was short of having positive cultures of sera, there didn't seem to be much doubt that a meal -- and it was a recurring meal every Thursday, they would serve the same dish -- and so there didn't seem to be much doubt on the part of the investigators that this particular facility was linked.

There have been many anecdotes since that tell us that actually there have been a lot of problems amongst Americans developing a very similar rash illness in Europe, particularly in

Belgium, with Reforger Exercise every year, so there may be some history to this that's not well captured. And there's been a lot of speculation as to what may be behind it.

Despite some very detailed culturing of everybody, fluid and orifice and substance and serologic testing, unfortunately, they have not been able to identify a specific pathogen, but there's been a lot of discussion about the differences in the ecology of interoviruses between Europe and the United States essentially, and apparently there are some significant strain differences both cocsachi (phonetic) and effoviruses (phonetic) that they have but we don't have.

Clinically, the dermatologist/infectious disease guys thought when they looked at the rash, this looked like a viral example.

DR. CHIN: What's the food?

COL. O'DONNELL: What's the food, Dr. Chin asks. I really hate to answer that question, but it was beef.

(Laughter.)

Belgian beef.

DR. CHIN: And that was the only day of the week they made this?

COL. O'DONNELL: That's right, they served these particular beef dishes on Thursdays. Actually, it was three potential foods, and two of the three were beef on these Thursday meals.

DR. CHIN: How was it prepared?

COL. O'DONNELL: I don't know the details. Apparently not well enough, but I don't know the details.

DR. BROOME: Was there any secondary spread?

COL. O'DONNELL: No, there was no secondary spread. And this is a very mild -- it was very mild. I thought we were sending dozens of people to be admitted to the hospital, but we were just trucking them down there to be seen by the specialist and being sent back to duty. It was a very mild illness. And they actually videoconferenced with the folks at Walter Reed to take a look at the rash, and I got to see a videotape of the rash, and it was a very dramatic rash.

I thought it was going to be one of these things that's tough to see. The quality of

the videotape was terrible, but there was no doubt these people had a very dramatic rash. So, in some places, in some instances, very extensive. So, I became a believer that they really had something. There didn't appear to be any noninfectious reason that people could stumble across. So it remains a puzzle.

The other major concern going into Bosnia, of course, was environmental things, and I want to just touch upon some of the issues which I alluded to with the 35-millimeter slides, to kind of give you an idea of what's been going on in terms of exploring the environment, potential environmental threats to our soldiers, and this is going to be kind of a very superficial overview.

But the folks in the Center for Health Promotion and Preventive Medicine have sort of been the mainstay at providing the technical expertise, and they've been capitalizing upon some eyes and ears on the ground from Preventive Medicine detachments that are there, a new unit, the Theater Army Medical Laboratory, which has been deployed to Bosnia, which is -- its prime concern is infectious and environmental threats

in the environment, and the CHPPM has dispatched on several occasions their own little special teams to look into items of interest.

Brad Hutchins and John Rest have provided the next few slides I'm going to show you from the CHPPM, and they are sort of the subject matter experts on what's been going on.

(Slide)

Their project had the goals, as you can see, and you can read those, but the context in which we've really tried to do this very methodically is, of course, the aftermath of the Persian Gulf War. There's been a lot of second-guessing ourselves and a lot of people have been second-guessing the Department of Defense about how we've not really documented very well those things to which we might have exposed our soldiers during the Persian Gulf War.

And what we hope to achieve through the surveillance that's going on here -- and this is not surveillance of health events, this is surveillance of the environment in which we operate -- what we hope to achieve is to at least, one, identify if there are any potential threats and, as appropriate, counter those

threats and, secondly, really to document all of that.

(Slide)

These are the things about which people were concerned.

(Slide)

This one is an allusion to the fact that not only might we find things when we get there, but we also might make things worse by the things we do ourselves, and so we need to be attentive to that as well.

(Slide)

A broad range of things about which one might be concerned.

(Slide)

And this is a summary of kind of what's been done so far, just highlighted in red the fact that the CHPPM has again sent over a special team to look into some specific areas, in this case, air. This was fulfilling a promise they made. They previously monitored air quality in a number of locations there, but they had indicated they needed to go back after there had been some climate and seasonal change, to relook at the situation, and so they've got a team over

there doing that again.

(Slide)

I alluded to the Theater Army Medical Laboratory, the 520th is the new unit. They went there, I believe, in December or January, I forget when they arrived. Well, it says there -- March -- I'm sorry. And there have been two Preventive Medicine detachments who have been in-theater for much of the time as well, and they've been a great help. We have a good deal of Preventive Medicine assets on the ground watching this.

(Slide)

This is a summary slide, and I'm not going to get into the details, but it's a graphic way of demonstrating the kinds of sampling that had been done, are going on, and presumably will be done throughout the operation.

A number of different sites scattered through U.S. sector which need to be monitored, varying type of samples which have been taken, essentially water, soil, air, and probably any other chemicals that may have been found on the ground.

So, they've been trying to be very

methodical. It's a big task.

(Slide)

And here are some interim conclusions based upon what's been done so far. In essence, of those things which I mentioned have been sampled, they've felt that really there is no likelihood of any acute adverse health effects.

The point had been made that our water supplies are protected, as I alluded to earlier, so that even if there are some nasty things which may be floating through the air, they are simply just not going to get into those things which we ingest.

I am told -- and I don't have the details on the data, I have not seen the mountains of data which they have undoubtedly generated thus far -- but I am told there have been, particularly in the air samples, a few contaminants present which are noticeable, I'll put it that way, below standards for this country for short-term exposures, but if one were to spend a lifetime in Bosnia breathing in that kind of air, I've been told there may be an excess risk of cancer, about one per million inhabitants, if one spent a lifetime breathing

air like that.

In that context, it was felt that since we don't have a million people there, we have 20,000 people there -- and they are not going to be there for their lifetimes, they hope -- that the risk is probably insignificant for the group in question.

Despite that about potential carcinogens, it was acknowledged there was a whole lot of particulates in the air, as you can imagine from that slide of the smokestack and, although those were large enough to be felt not to be of significant concern over the long haul, they might be irritants to people who were otherwise susceptible to irritation of the respiratory track.

Thus far, these recommendations have been made and, in essence, these were not tricky recommendations.

The last bullet is a reference to the fact that they may be characterizing very well the kinds of exposures, if any, to which our folks may be exposed, or documenting the lack of exposures at various locations, but we need to make sure we pin down the other half of the

equation, which is, let's make sure we know who or where our folks were during their time in-country, again, in part, an aftermath of the Persian Gulf War where there's been a whole lot of doubt, or actually we just don't have documentation, or good documentation, of where all our folks were during the Persian Gulf War. And, again, if we can do a better job of that, then if anything should come up in the future in terms of a question about health effects of being in Bosnia, then if we know where our people were then we can kind of attempt to answer such questions.

(Slide)

These are some challenges alluded to by the group, and I won't dwell upon that. I think you've got copies of all these in your handout.

One last thing I want to describe, at the behest of Department of Defense, we've put in place a fairly thorough process by which folks who are returning from the theater will be evaluated or screened to ensure that they don't have any current medical complaints which need attention, or to make sure that they don't have

any niggling and minor medical complaints which might mushroom into something more serious, as well as to document the state of their health as they perceive it as they leave.

And so as a part of the process by which people will get out of theater and get home to Bosnia, there's a three-phased screening program been institutionalize.

Phase 1 essentially is to be done in-theater, and it consists of a briefing in which the individual is told what or what not they may have been exposed to, essentially what the health threats are. A lot of that will have to do with the infectious disease threats. But it will kind of be a brief review of what they may have been exposed to.

There's a fact sheet about their experience as it relates to their health, and those two together sort of constitute, if you will, a form of counseling, and the individuals were all asked to fill out a health screening questionnaire.

They are also asked to fill out a psychological screening questionnaire, it's a three-part thing, getting at various kinds of

potential psychological aftermaths or conditions which might be related to their experience.

And as they go through this screening process, if they respond to any questions in a way that would suggest that these people need to be evaluated on-the-spot, then they are to be referred on-the-spot to appropriate medical expertise to deal with problems before they even leave-country.

What I've shown there is that so far -- there have been about 5600 people who have been screened thus far, and a few of them have actually been referred for consultations.

The screening forms are ultimately supposed to go back to an office in Falls Church, Virginia -- DOD Health Affairs Office, which is the central repository of all these forms.

In addition, while still in-theater, people are supposed to be providing a serum specimen to go to the Army/Navy Serum Repository in Rockville for storage, for possible future use. That's kind of Phase 1.

Phase 2 is to be done within 30 days after they leave Bosnia, and it may be done here or it may be done in Germany, wherever they go

back to. It's essentially a repeat of the screening questionnaire, the general screening questionnaire, to see how people are feeling. And, again, if they respond in the affirmative to any of the sensitive questions, then they will be referred for medical evaluation.

And then, lastly, Phase 3 is simply a tuberculosis skin test 90 days after they've left the theater. That's the general terms of what's planned for everyone who has been to Bosnia and returned. They have to have been in Bosnia, Croatia, or Hungary for at least 30 days to be eligible to participate in this program.

That's kind of what's happening right now with respect to Bosnia. Does anybody have any questions?

CHAIRMAN FLETCHER: That is a commentary and an informational item from Col. O'Donnell. Thank you, Colonel. Are there any comments or questions?

COL. O'DONNELL: Dr. Chin?

DR. CHIN: A couple of quick questions. That Hantaa Virus case in April, was that made public? Was there a Public Information release on that?

COL. O'DONNELL: Actually, I don't know. I mean, it's not -- I don't believe it's close-hold.

DR. CHIN: And I've heard about stress teams that were going to be mobilized. Is that the screening process, or is there --

COL. O'DONNELL: Well, there's been a Combat Stress Control Team in-theater for pretty much the whole operation, and they sort of -- their efforts are a combination of outreach or proactive working with units and, secondly, responding to queries or requests for assistance within the theater.

That sort of -- that's a military unit. Folks wear camouflage uniforms --

DR. CHIN: Is that something new?

COL. O'DONNELL: No. No. Those teams were deployed to the Persian Gulf as well. I can't tell you before that what their history is, but I think there's been -- the military has always recognized the threat of psychologically-induced problems related to military operations. I don't know the history of the Combat Stress Control Teams prior to the Persian Gulf, but I think -- Col. Burger, you've been around a long

time, do you recall offhand --

COL. BURGER: You've been around a long time, too.

(Laughter.)

They are several years old, but they've certainly had increased emphasis since that time.

COL. O'DONNELL: And in addition, there's a lot of interest in psychological, you know, aftermaths of military operations. There is a --actually an arm of the Walter Reed Army Institute of Research has had a small psychological team in Europe for several years and, as part of this operation, they've continued or geared up and administered to folks going to Bosnia a standard questionnaire they've been using for a long time.

And their plan was actually to administer it to folks as they were going, to catch them mid-cycle while in Bosnia, and then to catch them upon return to Germany, and that's been going very well. I know they've got a number of participants in the several thousands. I'm not sure of the sampling strategy, but they should have a lot of data. And I think, again,

it's a reflection of our interest in the psychological ailments at least associated with these kind of operations.

CHAIRMAN FLETCHER: Dr. Schaffner was next.

DR. SCHAFFNER: A quick question. Of those at highest risk, do we have some idea of what proportion of people offered tick-borne encephalitis vaccine actually accepted it?

COL. O'DONNELL: I was afraid you were going to ask me that question. It was my understanding they'd identified a population that was felt to be at high risk based upon what they were going to do, and I heard a number 5- or 6,000 folks out of, let's say, 20,000 who were felt to be in high-risk category. And if that were the denominator, then the level of participation would sound pretty good. However, I'm not sure it's actually being done that way, and I must defer to --

COL. BURGER: About 6500 people were determined to be at high risk based on where they would be, such as mountain soldiers that are exposed to bush, and so on. And we saw about 3700 --

DR. STEVENS: So about two-thirds.

COL. BURGER: Yes. And hopefully we will be able to work proactively through all of these problems and get these folks back to see whether the recommendations we've made are the right thing. We need to look at that whole population of people to see whether it's working effectively.

CHAIRMAN FLETCHER: Dr. Broome.

DR. BROOME: The soldier who had the respiratory, was there a diagnosis made?

COL. O'DONNELL: Actually, I don't have anymore details than what was provided to me. The clinical diagnosis was a viral meningitis.

DR. BROOME: But no specific etiology.

COL. O'DONNELL: But no specific etiology. So, who knows?

DR. BROOME: I was just curious about you indicated there might be a need to include troop location information. Maybe you could talk a little bit more about that. And also it looks like the environmental sampling is very much around the campsite. Is that, in fact, what it is inferred?

COL. O'DONNELL: Okay. The location -- just let me elaborate on the location. I think it's -- what we want to avoid is to have a soldier come back to us a year from now, let's say, and say, I'm sick because I was exposed to blah-blah in Bosnia. And we ask him, well, where were you in Bosnia? And he may be a little uncertain actually. That was certainly the experience in the Persian Gulf. Some soldiers had no idea where they were in Saudi Arabia. I mean, you just go where you're told, basically.

And to the extent that might happen, it would be difficult to go much further with an assertion like that, without actually knowing where the soldier is.

So, it sure would be nice to be able to say that Pvt. Jones had actually spent six months in Tuzla, his day-to-day duties were driving the roads in that vicinity, but not ranging beyond 20 miles from Tuzla, and at least be able to narrow it down to that extent what was the prospect that he might have been exposed to something in the environment, or whatever might come up.

I think that's -- the concern is that

Pvt. Jones -- he might not recall where he was and, if we have no idea where he was, that's not too swift, to be that much in the dark about where Pvt. Jones may have been for 12 months of his life. And I don't think this is going to be a problem, but I think to the extent that we felt we were short on that kind of information in the Persian Gulf, that we may just now, in 1996, capture for the folks in the Persian Gulf. I think that's an unfortunate experience that we don't want to replicate.

COL. FOGELMAN: Could I just ask you to comment on the tick cards?

COL. O'DONNELL: Sure, and I didn't bring --

COL. FOGELMAN: Everyone has a copy.

COL. O'DONNELL: They do? Great. Okay. Those were intended to be handed out to every soldier in Bosnia and, from what I hear, they've currently made it to just about every soldier/airman in Bosnia.

They were intended to be in simple enough languages, with pictures, for soldiers to understand. I'm told they actually commanded a lot of interest on the part of folks on the

ground. And not here -- and I don't know if you brought with you -- but one other item which went to Bosnia were these playing cards. Has anybody got any in the room?

These are real playing cards. You can play poker with them, or bridge. And all of these, they and these you have in your hand, were developed at the Center for Health Promotion and Preventive Medicine.

The playing cards -- there's 52 cards and there's a couple of jokers. And each card has on the business side a little, shall we say, two-liner on how to protect your health in the deployed state. And it includes some things like diet, but it also talks about some field sanitation and things. And I am told they were immensely popular, too.

Now, it may be only because they are playing cards, I'm not sure, but I am told that they were looked at very positively. And I imagine if you're playing bridge and you're waiting for your dull-witted partner to bid and it takes him five minutes, you may actually read the cards -- oh, here's one -- you may actually read what's on the cards. We'll pass this around

since we have one set in the house, anyhow, and you can kind of take a look at it. And they are very nice.

CHAIRMAN FLETCHER: I've been advised by Col. Fogelman we should take our break now and have our next presentation afterwards. Thank you. We'll take about a ten-minute break, and thank you, Col. O'Donnell.

(Whereupon, a the proceedings went off the record.)

A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

(1:02 p.m.)

COL. JONES: Can you hear me? Great.

Well, I'm glad to be here. I think that this is very near the culmination of our work group's enterprise, at least with the report. What I'd like to do is provide you with an update on injuries and a brief overview of some of the key findings of the report, and then look at progress which is nearing, as I said, an end -- with the report at least -- and make a few concluding remarks and solicit your final recommendations.

What I'll talk about today -- What I'll talk about first, as I said, I'll briefly review some of the key casualty or fatality and hospitalization observations of the work group. I'll provide you with a brief update on injuries during Bosnia and other combat operations, and then I'll give you -- provide you with some information on some other DoD medical surveillance initiatives that may be of interest and to which this report, I believe, will contribute. Then I'll cover the final pieces of

work that we need to do on the report and sort of provide you with the report card, if you will, of where we're at. We're 99.5 percent of the way there, I believe.

What I'd like to do in the next series of slides is review some of the key observations of the work group related to injuries. Those of you who have read the report, I'm sure, have seen that if we look at the distribution of deaths as a percent of all casualties for the Department of Defense -- This is all four services now from 1980 to '92, which was the period that the work group examined -- 60 percent of fatalities in that period were due to accidental or unintentional injuries.

Another 19 or 20 percent were due to suicides and homicides. So, really, about 80 percent of all of our deaths have occurred as a result of injuries.

Now of interest, though, is that, if we look at the trends in fatality rates for the services, there has been remarkable success in reducing the incidence of unintentional injuries as a cause of death, but despite this tremendous success, about a 50 percent reduction in

fatalities -- This pointer is really hard to see -- the accidental deaths, as we call them in the military, still account for more deaths than all the other causes combined.

So in that area, injuries are clearly a place to keep our focus and that, of course, is why we did the report.

If we look at another level of severity where we have very good data -- and the reason I'm presenting hospital data instead of some of the other data is because we can now begin comparing hospitalizations not only during peacetime but hospitalizations as we've seen during a current deployment, and I'll provide you some of that data.

If we look at the distribution of hospitalizations by principal diagnosis groups, we see that musculoskeletal conditions for the Army in 1994 were the leading cause of hospitalization, and I've juxtaposed that with injuries and poisoning, which is really mostly injuries. The names here for the pie chart come from the principal diagnostic groups of the ICD-9 code book.

I've juxtaposed these two groups,

because it's becoming increasingly apparent that these muscular skeletal injuries are largely the recurrent or chronic effects of past injuries. If you're going to measure the true burden of injuries, you need to look at this.

This is one of the findings of this work group. It's not really well recognized that that's the case. Certainly, in the military it is. Civilian populations, we might expect something different.

I'm always glad that there's someone that's prepared.

If we look at the distribution of hospitalizations for the Navy, these are for enlisted personnel in the year 1992, we see the same sort of thing. The combined total for musculoskeletal conditions and injuries is about 26 percent of the total. Musculoskeletal conditions are the leading cause of hospitalization.

Now I might add that, certainly for the Army, there has been a very interesting trend, and that is a steady upward trend in hospitalization for musculoskeletal conditions and a downward trend for acute injury

hospitalizations. One has to wonder if this isn't the change in practice or coding or something.

Anyway, if we look at Navy personnel, musculoskeletal conditions and injuries account for about 26 percent of the total. Musculoskeletal injuries are actually the second leading cause, if we look at these separately, with mental being the first cause, pregnancy, digestive diseases, respiratory and so forth, as you can see there.

If we look at the Air Force, we find a very similar sort of thing. You can see that for the Air Force musculoskeletal and injuries combined account for about 22 percent, but there the leading single principal diagnostic group is digestive diseases, but injuries and musculoskeletal are right up there, if we count them separately; and if we look at them together, they are really the top group.

The work group, as you know, has concluded that injuries are a leading cause of death, hospitalization, disability and out-patient visits; and if you will remember, those of you who were here last October, saw an injury

pyramid, and in the report that same thing is there.

If we look at the ratios of deaths to disabilities to hospitalizations to out-patient, the base of the injury pyramid, the out-patient visits, is very, very broad; and in the Army the ratios go, for every death there are about 15 disabilities, 60 hospitalizations, and 1100 out-patient visits.

For the Army and Marine Corps it is a very broad base. So we need to look at other things, but the hospital data I've focused on and in the report spent a lot of time on, because it is one of the best databases that we have.

Now if we now move on and look at data from the Bosnian Theater, you saw some data on out-patient visits this morning. We now have the capability to track unit level rates, as you saw, in theater and we can track on a near real-time basis hospitalizations in the theater as well.

One of the things you saw in Colonel O'Donnell's report this morning was a comparison of the top ten causes of hospitalization in theater to those for FY '95, and also a comparison of the total overall rate.

I believe the rates were something like 97 hospitalizations per 1,000 person years in the theater compared to 135 per 1,000 person years in FY '95 Army-wide. That's a differential of about almost 40 percent, I believe, higher rates during the year before the deployment for the whole Army.

Now what we see here also is that, again, in theater the single highest percent of hospitalizations were due to injuries, but musculoskeletal conditions contribute another nine percent. We'll look at a breakout of these things. Digestive -- ill defined signs and symptoms is this one, if you want to make a note to yourself -- and infectious diseases is actually the third or fourth leading cause, and that as a percent of the total seems to be growing.

Now looking specifically at injury diagnoses, what we can see is that in theater 18 percent of the diagnoses are knee related complaints, acutely torn cartilages, dislocations, sprains, that sort of stuff.

Fractures of the lower extremity are the second leading cause, about 11 percent of

injuries; head injuries and concussions, another ten percent; upper extremity fractures are fourth at six percent; burns and cold weather injuries and a few other things that you can see there.

So we can see that the injuries that are getting hospitalized in terms of severity -- fractures, certainly, and head injuries are significant and a big proportion of what we're seeing there.

If we look at the distribution of the top nine muscular skeletal conditions -- and I did the top nine, because we started getting down in such small numbers after that nine that it hardly makes sense to enumerate them all, and there's a big tie of about four or five categories there at ten -- back pain and complaints are the leading cause of hospitalization for musculoskeletal conditions at about 35 percent, followed by leg pain due to soft tissue injury, knee pain and instability, disk disorders, and then degenerative arthritis round out the top five.

Now one of the things that's becoming increasingly capable is we can put recent experience in the context of past experience and,

as we search our historical databases and other recent databases, we can begin putting this together.

This is a chart that is seen fairly often in textbooks going up to Vietnam. What we have here is we have the distribution of disease and non-battle injuries as a percent of total hospitalizations for World War II through Southwest Asia or Operation Desert Shield/Desert Storm.

What we can see is that hospitalization for battle injuries have ranged from a low of about four percent to a high of about 23 or 24 percent, actually four to 23 percent, during these conflicts and wars, and non-battle injuries as a cause of hospitalization have ranged from a low of four in Southwest Asia to highs of around 17 or 18 percent for the Korean and Vietnam Wars.

Now what's interesting is generally, when this histogram is shown, the assumption is that the bulk of this disease column is infectious disease. This is one of the reasons why we need surveillance systems, because we need to know what is really causing these casualties.

It isn't primarily infectious diseases, and I don't want to be misunderstood. I think infectious diseases are terribly important and that they can have an explosive impact on military and other populations, but we also need to know exactly what's happening so we can prioritize our resources on where our problems -- our other problems like here in Southwest Asia we see that non-battle injuries accounted for about 25 percent of the total compared to five percent for battle injuries.

Musculoskeletal conditions accounted for 14 percent of hospitalizations, followed by digestive, general urinary, respiratory, and a few other categories. Infectious disease coded as infectious diseases accounted for about three percent, and another aside on that is that's misleading also, because infectious diseases get buried in the respiratory category, the dermatology category, genitourinary and others; but when we search all those categories, infections come up to about ten percent.

Jim Rider here at WRAIR has done that. So we now have the capabilities to really break out where are our problems, both in peacetime and

combat. I ran across an article recently that I summarize in a little different form in the report, and it looked at hospitalizations among Marines in Vietnam.

What we see there is that 21 percent of the hospitalizations were due to injuries, 16 percent to infectious diseases, and another eight percent to musculoskeletal conditions. So again, even in that conflict, injuries and the acute -- and the chronic effects of injuries as muscular skeletal conditions really were a substantial proportion of the total, almost 30 percent.

Now I think that what we can see from this and what we know from past experience is that injuries are clearly a very large problem. That's the first step in solving the problem.

The other thing that I think is important in this is that we have clear evidence that we can prevent injuries. We've had some successes. At the last meeting we saw that aviation fatalities are a clear success. This is Navy data that we saw.

Those rates have gone down steadily and, even if we look at just the last few years, this curve looks flat, but the rates from 1975 to

the present have gone down by over 50 percent.

We can look at Army data from the Army Safety Center, and we see similar trends. With the exception of Operation Desert Shield/Desert Storm, the trend has been downward with a reduction in rates of about 40 or 50 percent.

We saw that we had some other successes in terms of private motor vehicle fatality rates, which have decreased. I mean, this is a nationwide trend, obviously, but nevertheless, it indicates that we can prevent injuries when we set out to do it.

One of the important things about this is that we don't have to stop the activity. One of the questions that comes up, for instance, with sports injuries is -- by commanders -- "I don't want to stop sports programs. You know, I can't envision an Army without sports programs;" and neither can I.

When we set out to prevent motor vehicle fatalities and serious injuries, no one said we were going to stop driving. I think that we can apply that same principle to other conditions. We don't have to stop doing some of these things. We just have to do them smarter,

and we have to do them in a different way; but the motor vehicle fatalities for the Army, as well as the other services, have gone down.

Motorcycle accident fatalities have gone down even more dramatically, and the Navy has some very good data on that. There's a trickle-down effect of these prevention strategies for motor vehicle accidents.

Hospitalization rates for motor vehicle crashes in the Army have gone down more than 50 percent from 1981 through 1994, and this success is not limited simply to privately operated vehicles.

If we look at the trends, the rates are rather small, and with the exception again of Operation Desert shield/Desert Storm, the trend line is downward for military vehicles, and there are two messages here.

One is that trend line is down, but in combat vehicular accidents are a big cause of mortality, and we saw that with the presentation to our group from Mr. Rider from WRAIR.

Now I think it's important for us as a group to extract the lessons from these type of data. I think one of those is what are the

components of prevention success? I would submit to you that the places where we've had success have been places where we've had clear targets, where we've had surveillance systems, where we could track and monitor the effectiveness of programs that we put in place, and that we've had strong support from leadership.

We need all of those things if we're going to expect success. I think that those things that we have focused on, we have succeeded on, but I think that the other lesson is that these changes like weight loss are incremental, and you need a monitoring system to track them so that you know that they're down and you can be confident that your systems are working.

Now you should have briefing packages. I added as an afterthought -- and it shouldn't have been an afterthought, but I had had some phone calls, and I realized that one of the things that I hadn't really done adequately in the report was to emphasize injury prevention research and the value of that.

Some of the programs that are conducting this research have now very small budgets with the increasing pressure to reduce

the size of programs, and I have a concern that some of them may be on the verge of extinction.

I wanted to highlight for you some of the key things that you've seen before. One of the great research successes was the intervention trial that looked at this ankle brace. The development of this ankle brace or, rather, the testing of this ankle brace was really an example of the type of teamwork that I envision, and partnerships that I envision it taking to solve the problem of injuries.

We knew that injuries resulting from parachuting were very common and that, even with the parachute, this sort of activity, jumping out of airplanes, can be hazardous to your health. Hospitalization data showed that ankle fractures and sprains were a significant cause of hospitalization.

The Safety Center provided us a clue as to where those were coming from. The Safety Center data showed that tactical parachuting injuries accounted for 50 percent of combat soldiering injuries and that 50 percent of those were due to ankle injuries.

As a consequence, a good friend of

mine, Colonel Jack Ryan who is, unfortunately, retiring soon, had worked with ankle braces to prevent basketball injuries at West Point, and he thought, you know, if we could design -- If we had a brace that would fit outside the boot, we could prevent jump related injuries during airborne operations.

He came to MRMC and then to our research lab in Boston, and we did a collaborative project. What we found there was in our first intervention trial and subsequent ones, there was a significant reduction in the incidence of ankle sprains in those who were randomly assigned to wear the brace. In this particular study it was an 85 percent reduction in injury rates.

Now we have had some other successes that some people don't really recognize. In 1985 the Marine Corps was having an epidemic of stress fractures among their incoming recruits, and they were poised to buy insoles, shock absorber insoles for every incoming recruit.

They asked us to -- at the last minute, to test the insoles to see if they really reduced injuries. The success of this study was

not in proving that the insoles worked, but in fact just exactly the opposite.

What we found was that the shock absorber insole group had rates of stress fractures that were the same as the control group, and this was true for overuse injuries in general and all other injuries.

The point that I'm trying to make is that we need research, because some things work and some things don't, and it helps if you can identify the things that work, especially if they're going to cost you money, beforehand and not invest in the ones that don't work.

Now another area of clear recent success has to do with training-related injuries. You heard from Richard Shaffer from the Navy, Commander Shaffer from the Navy, last report. We knew from civilian studies of runners that there is a dose-response relationship between exercise -- and this is probably not true of just running but all exercise. The more you do, the greater the risk of injuries and the higher the incidence of injuries among people doing higher mileage.

We also knew from past studies conducted by the Army and others that there was a

high incidence of injuries associated with our running and physical training programs. The Naval Health Research Center took this a step farther.

They designed an intervention trial that you heard described. At that meeting we didn't quantify the mileage, but Commander Shaffer presented a paper at a recent national meeting of the American College of Sports Medicine. They quantified the mileage for the control.

The cadre, which was a test group which was an intermediate plan between the expert panel- recommended training program, which primarily focused on reducing the amount of running and other weight- bearing activities but primarily running -- what we see here is very similar to a study that was done in the civilian world back in the late Seventies. Anyway, what we see is that the mileage for the control group, the cadre group, and the expert panel group -- the mileages were 55, 41 and 33. The stress fracture incidence was 3.7 percent, 2.7 percent, and 1.7 percent, and the run times were as you see over here, ranging between 20 minutes and 20

seconds and 20 minutes and 53 seconds.

So we had more than a 50 percent reduction in injuries in the two test groups and a 2.5 percent increment in time -- a very impressive trial.

I think of even more importance for many is the morbidity and cost savings. They estimated that, as you saw, a 50 percent reduction in stress fractures. That meant 370 fewer stress fractures that year. They estimated that they prevented on the order of 15,000 lost training days at a cost savings of $4.5 million.

I can tell you that the investment in that project was far less than $4.5 million, and the return on that investment should go on for years.

My point here is that we have a very small infrastructure and very few resources for injury research. I think we could well invest more and probably get a return on our money.

Now getting back to surveillance, I think that the work group's effort really, because it was all encompassing, we didn't look just at injuries. We tried to take a

surveillance approach to this and look at how important are injuries in the context of other things.

What we developed is more important than just injuries. Injuries are not the message in the sense that they are the only thing that's out there. The real message is that you can use surveillance systems to identify the problems that are confronting the military in terms of readiness and cost.

I think that this report, because of its comprehensive sort of view of the health of military personnel, can contribute to other initiatives. I thought it would be important for you to understand that there are some efforts out there, and there is a lot of interest in medical surveillance.

Deployment medical surveillance, you saw, has taken off and is receiving emphasis from the highest levels of the Department of Defense and the Joint Chiefs of Staff. There are also some other initiatives.

The Defense Medical Epidemiology database is being constructed with Defense Women's Health Research Program funding, and

their feeling about this was that in order to interpret the health of women, you really need a context. You need to have a database that looks at both men and women.

They funded a project that is overseen by Tri-Service Advisory Committee on Research Databases that is really, truly a tri-service database, and they have a contract out to build a system to link the databases at the tri-service hubs for the Air Force, the Navy and the Army, and we can project a virtual DoD database sometime within the next nine months to a year.

The Army already has a relational database that is functioning, as you've seen, and the other services are hot on our heels, and we're working together to build this thing.

Another more recent effort sponsored by the Office of the Assistant Secretary of Defense for Health Affairs is a global medical surveillance in emerging infectious diseases initiative.

Its focus is emerging infectious diseases, the hub for which would be here at WRAIR and the overseas labs, but it also links in those other DoD surveillance databases from the

services, from the DMED.

The location of the Center for Comprehensive Surveillance is not clear yet. That's something that needs to be debated. It may be an issue that some of you get involved with at a later time. I'm not the one to tell you that, but it may be there.

More specifically to injuries, I have chaired another work group, the DoD Injury Surveillance and Prevention Work Group. Because of the desire to move ahead quickly with the AFEB work group, that work group shared data which was the foundation of our report. They've been credited with that.

That work group has an ongoing initiative and should have a report out of an inventory of medical and injury databases. We will be producing a directory of data resources with that, and that report, which we will probably call "Atlas of Injuries in the Military," should be out by the end of this fiscal year or shortly thereafter.

Now on to our own report. We listed some key recommendations from the work group itself at the last meeting. This is kind of a

report card on how we did, looking through the report.

I think that we did an excellent job of emphasizing the importance of injuries as a cause of morbidity, mortality and disability. We recommended that comprehensive, integrated, distributive medical surveillance systems, relational databases be in place, and I think that the Board's recommendations that were written by Dr. Perrotta really made -- articulated that second point very well.

A point that I don't think the work group developed adequately was that we need routine communications between medical surveillance, safety, research, and other organizations. Probably didn't emphasize those other organizations.

The partners outside of the medical safety and surveillance community are probably the ones who are really going to prevent the injuries and diseases that we're looking at. So that's something that maybe we can rectify.

We've recommended that there be a tri-service workshop of some kind to look at injury prevention and safety and surveillance, I might

add, and a role of the medical departments that was not, I think, adequately emphasized is to determine what is our role in this arena. Clearly, we have some, but actually preventing injuries may not be it.

Implementation of prevention strategies and programs prioritized on the basis and magnitude of the problem, and availability of solutions, I think we did a pretty good job of putting forward.

In terms of the specific things that we needed from the Board to get the report out, we've reserved a section for a chapter. That chapter has, in fact, been written. It's been scrutinized by Board members and by the work group.

We had a few comments back. I believe Dennis has those comments over there. We did use the Board's chapter to highlight prevention successes, because a number of members felt that that was very important.

The forward to the report is not done yet. I had hoped to have it, and Dr. Kuller and Dr. Hansen have been -- have agreed to do that and are working on it, but they had had very

heavy travel schedules recently, and I was not able to get a copy of that; but it would be my intention to add that to the front of our report, and then send it forward, I guess, to Dr. Joseph and others at the Assistant Secretary of Defense for Health Affairs.

Once they have had a chance to scrutinize it, I would assume then we could circulate this as a military technical note or report, which brings me to the final bit of business here.

I don't see -- I think we're within one to two weeks of work. I mean, it's really just a few days. It's just a question of time until we put all these final pieces together and send the report out and have it polished.

The final piece is, again, I think that enough work and effort has gone into this and the value of the contents is such that we should be able to get it in a peer-reviewed publication. Dr. Kuller has agreed to look at that.

If nothing else, Military Medicine said that they would strongly consider a supplement, but I think that the quality of the

work that went into it deserves broader circulation than that.

Finally, what I'd like to do is look at some conclusions that are summaries of things that we've seen in the past. There was a question, I know, at times, how come the heavy focus on surveillance and the magnitude of the problem?

We tried to look at what we had to answer, these questions that really follow the five steps of the Public Health approach. The first question, of course, is how big is the problem?

Although there's been this sort of sense that injuries are a big problem and most people who have been in any of the military services know that they're out there, we hadn't really had a clear idea of how big that problem was. So that was the clear first step, was to provide the data that shows the magnitude of the problem.

We can also show that we have good data on causes of injuries. We have research and other programs that can give us an idea of what works to prevent the problem.

The step that we didn't focus on, and really is the business of the future, is who needs to know what, and what do they need to know? Those are the partners that we need to draw into this circle to prevent injuries.

We clearly have the systems in place to monitor how effective they are, but I think in his final chapter Dennis made a very good point: and that is that just because these databases are out there doesn't mean that they are in shape to be used.

Some of them are being used, but deaths and disabilities, in particular, are not looked at closely enough, and out-patient is not automated to an extent that we can really use it.

We need to now develop the relational databases with distributive query capabilities so that we can really look at the broad spectrum of health in our forces and use that to prioritize things. Ultimately, if we are going to accomplish our vision of driving down the size of the entire injury curve, we need those data systems.

We need to move our focus away from

fatal and severe injuries to the more moderate and even -- I don't think any but the most minor are really minor. Even an ankle sprain means you have a disabled soldier, but we need to move our focus to the whole curve.

In order to do that, we need to have a comprehensive injury control system, combining all the elements, primary, secondary, and tertiary, prevention. The engine that will drive our success is really data and data analysis.

We need surveillance, research and monitoring, because that tells us where we can best allocate our scarce resources, and it will tell us where we are succeeding; but as I alluded to earlier, we will not succeed if we try to do this within the medical community.

I used to feel a burden. I thought I understood injuries, and people like Colonel Gatos would come to me and say, "Bruce, but we aren't preventing injuries yet." It was true, and I took that personally for a long time, and I thought, well, how do I prevent injuries.

The problem wasn't really that, because then I realized it wasn't my responsibility to prevent injuries, that really

the people who were going to do this were others, but my responsibility was to get the information in the hands of the people that could do it.

The key partners in this are commanders, supervisors, and soldiers. That where the injuries are occurring. That's where we're going to prevent them. We need to get this information into their hands and others' who can work on this, safety, occupational medicine, health, environmental health, and others in the post community. The glue that cements this together, though, is information, good information.

Thanks. We're very near the conclusion of this. You've given me excellent support. It's been a reward having your enthusiasm, and has kept my personal energies going at times when it seemed like there was more work than all of us combined could do. Anyway, thank you.

CHAIRMAN FLETCHER: Thank you, Bruce.

Let me acknowledge several people around the table who were quite involved with this, and an up and coming member, Ron LaPorte, I

believe. Correct? He will be on the Board as of August. So we have a continuum of people, and again very nice, Bruce.

I really would urge you, as I have before, to try to get this in a refereed publication, because this is really good. I mean one that's a general journal, because this is a very good document.

COL. JONES: Well, that's the next step. We're very near the culmination of the first step, again, which is to get this to Dr. Joseph and others at Health Affairs, and then to get it more broadly circulated as a technical document for the military, and we will pursue getting it in a form that can go into a publication. Thanks.

CHAIRMAN FLETCHER: Are there questions? I'm sure we have some comments and questions.

DR. BROOME: -- may not have been broad enough in terms of taking into consideration what's happening in the health information system in general, -- [static] -- and try to encourage standardization of systems with what's happening in the private sector and HHS.

COL. JONES: Could someone take some note son that so that I can take this back with me, because given that the forward is not in here yet, we have an opportunity to include these comments in the section, and Dennis may want to share some of this.

DR. PERROTTA: Good point. We could probably work it in with just a few extra words.

DR. BROOME: Yes. It basically goes to one sentence, I think, to do it.

CHAIRMAN FLETCHER: Mike?

LT COL. PARKINSON: The other thing, I guess -- I've looked at it on and off so many times I've lost track of it -- is somewhere in the summary conclusion, unless I missed it, is, hopefully, there needs to be a recommendation more specifically to the single -- the cause of most of them, I guess, is alcohol related, and you can't find a single cause to do that, and particularly our linkage with our social actions programs on bases and SP's. It's probably something that needs to be highlighted.

Every two years we do an alcohol-related impact study. We went from 25 percent of all deaths being alcohol related down to 19

percent --

[static] --

COL. JONES: I think probably the way we could do that is to put it into the recommendations as something we need to look at, because what I don't want to do is put words in the work group's mouth. That was mentioned, I believe, but it would be hard; but I think that the Board could do that, if they wanted to, because you have seen that data at other times, and I know you have brought it up.

So the conclusions might add a brief sentence or something that would give it recognition at the end of the report, if we wanted to do that, and if someone would make a note of that.

LT COL. PARKINSON: The other point I was going to make is just informational, but it may bear -- It probably can't bear on the report at this time, but we have been engaged in the last four weeks on an Air Force-wide suicide -- charged by the Deputy Chief of Staff of the Air Force in the wake of Admiral Borda's suicide.

What we have done is we've engaged -- [static] -- at CDC, others, everybody from Europe

to the Pacific -- on what programs are out there on prevention and response to suicide. As we put that together, what we're finding out -- is there's no cross-fertilization between what we do, what the chaplains do, and people are just allowed to fall through the cracks --

I think, as we develop that knowledge, it may be very instructive for injuries generally.

COL. JONES: I would echo that. Getting the other information that one needs to understand intentional injuries is very hard. It's distributed in databases that it's difficult to get access to, and for which generally there have been only reports of frequencies and not rates.

So I suppose that what we could do is emphasize the need to link up with these other databases. Nontraditional surveillances databases are outside the medical surveillance community.

CHAIRMAN FLETCHER: Other questions, comments?

DR. BROOME: I certainly want an official board vote on Col. Parkinson's

suggestion, including at least consideration of alcohol and other risk factors explicitly in our recommendations.

The other thing which was, this certainly talks about supporting research in intervention and control, but I think you make an excellent case that this doesn't happen if you don't spend the money, the fairly minuscule resources that we saw, for research and for the surveillance in research.

DR. PERROTTA: We actually got another comment that basically talks about responsibility for establishing and maintaining surveillance systems that are connected, and given appropriate resources, we could do that.

COL. JONES: But I think, Dennis, Claire's point may be, you know, a little more specific, that we need it for research as well, because the surveillance could be for systems that really are routine and ongoing, but that the injury research programs are very small. They wouldn't have to plus them up very much to get a big bang for their buck and ensure their viability.

DR. PERROTTA: Thank you. Does

anybody have, if I may, any big problem with the addition of sort of alcohol-related point, because I want to make sure that the Board recommendations we use do indeed reflect the general consensus.

COL. JONES: I thought I heard another suggestion, that perhaps in addition to alcohol we should include violence. The report did not spend a lot of time on intentional injuries. I know Dr. Broome had brought that up at an earlier meeting, two meetings ago.

So perhaps we could -- where you mention those, it might be an appropriate place.

(QUESTION FROM THE AUDIENCE)

COL. JONES: I agree wholeheartedly. I think we have we have a nexus of things right now that give us an opportunity, and it's a mixed blessing, because really the downsizing and putting pressure on organizations -- is putting pressure on organizations to do things differently.

One of those different things is, as your own resources contract, you look for other people that you can partner with to accomplish your mission. So there is a growing effort to

draw people together.

The Army Safety Center, for instance, for the first time has put together an Army human performance panel which is really an Army injury prevention panel that brings together, you know, a broad range of research, engineering, technical and surveillance organizations from the medical community, the R&D, not just the medical R&D community but, you know, the equipment developers and so forth.

I see this, you know, as a time of opportunity to begin doing these kind of things. The other thing that's different than in the past is we have the automation systems now. You know, you don't need a whole room to store the kind of data that would have taken to do what we did with this report.

You can store it on small chips. So with the growing capabilities to store and link data, I think what we need to do is sort of, as the report outlines, we need to pick our targets carefully, because successes are what's going to drive this, and there are some clear areas where we can begin to look for prevention.

COL. FOGELMAN: This goes with what

you said before about the fact that the medical community really has little control over outcomes for [static]. I think it's critical that once this report is blessed by Dr. Joseph, et al. that it is not just distributed outside the medical community but that it's briefed outside the medical community at a very high level to people that -- you know, briefing the commanders can understand, operational commanders can understand; how this type of information can give them the ability to act. It will pinpoint where they have a problem, and it shows the problems that we didn't even recognize as existing or were not able to quantify before.

If you could do that, I think you're going to have a lot of impact on the military system. Many times we tend to keep things within the medical community, more than we should.

COL. JONES: Well, I think if we approach this with the attitude that we have information that can contribute to prevention that we will be more capable of partnering with others, and I think -- one thing is that most of us in the medical community are not trained to think of prevention.

I mean, we're really out there to treat things once they have happened, but I think that there's a growing emphasis on prevention in all of the services and also on surveillance, and that this information can be identified to identify current and emerging problems.

I think that, you know, if we go out with a spirit of -- a team spirit, that we will have some success. I think we are having successes. Well, thank you.

CHAIRMAN FLETCHER: Thank you very much. The next component will be, rather informally, Dr. Parkinson and I, but let me make a few comments on where we stand with the preventive health services for men, and this is "men" in general, including women.

There are roughly 300,000 women in the military, as I understand. Is that correct, Colonel Fogelman?

COL. FOGELMAN: I don't know, actually. I'm not sure. It sounds a little high.

CHAIRMAN FLETCHER: Anyway --

COL. FOGELMAN: That might be right.

CHAIRMAN FLETCHER: Where we stand at

this point: The recommendations that we presented at the March meeting, we are working to expand these in the two areas; that is, stratifying for age and for frequency of these examinations.

Now I think, with Colonel Parkinson's familiarity with the trichea prime* system, I think this is going to be the optimal way to do this,and we should have this put together by August.

What I'd like to do is -- I've delayed a bit on this because of the small number of people on our wellness maintenance committee. We now have four people that will have a lot of input into this. I'm going to contact them prior to the August meeting and get their input, particularly Dr. Judy LaRosa.

I've already talked with her. She is a nurse. She is head of Allied Health at Tulane, and she's also been in the military. Judy was in for some time. So she knows from the inside sort of what's going on in the armed forces. So I believe that input will be substantially important and would keep us from having to modify this too much more in the future.

So that is the plan from this, and I will be working with Mike on this and the other new members as we approach the August meeting. So, Mike, you may have a few things to expand on that, and then we'll just have any questions.

LT COL. PARKINSON: Just very briefly, there are -- since the last time the Board met -- the official report of what's called A Quality Management Review on Clinical Preventive Services that's been released. It basically is a format of, if you will, a report card as it relates to performance of some key preventive services that are used in health plans in the civilian sector, along with some other clinical preventive services that we want to use as a baseline for DoD to be accomplished on an annual level to see how well our programmatic initiatives in terms of -- including our delivery of care do.

What I'd like to do is present it to the Board in the form of a full report at some future date. Dr. Fletcher has a copy of this, but to give you some flavor of the highlights, we've already been briefing this. At least in the Air Force, we're briefing it anywhere and everywhere we can.

Two or three copies of the report went out to every single facility, and we have strongly urged they use this in their CME and in their quality improvement effort.

To give you some idea, we looked at approximately 15,000 patient records across DoD in three groups: two-year-olds, Active Duty men and women with at least five years in the service -- so they've all had at least one opportunity for a periodic health examination -- and women over the age of 50; and looking at both the medical records and at appropriate other sources of data, including CHAMPUS and including other kinds of things -- I don't have the entire list.

What we did is we looked at two-year-old immunization rates, cholesterol, PAP smears, mammograms, alcohol, tobacco and STDs. In each one of those preventive services we developed a criteria for was the test performed, and then if the test was abnormal, what was the follow-up, using standard national public guidelines -- for example, the National Cholesterol Education Program -- If somebody had an abnormal cholesterol, what is the evidence [static] --

In terms of broad numbers DoD-wide,

I'm just going to focus on the Active Duty -- about 5,000 records in each one of those three strata that I talked about. So for Active Duty we found that about 70 percent of Active Duty, after we located the medical record -- and it was also interesting: of the medical records that we were supposed to be able to find for the Active Duty, we found about 25 to 30 percent of those that we were supposed to be able to find.

So part of that is, you know, again phrasing that down, is where is the medical record, and are these people that are listed as being assigned to the facility really in that facility?

Like most studies, you find out a lot about the process, at least for the outcomes that you want to look at, but you've got to know -- We're looking at this very positively; but it's a starting point to an accountable health plan.

Seventy percent of Active Duty had a cholesterol on the medical record within the last five years. However, if you look at those that were abnormal, above 200, and begin to get into the follow-up, what we find is that probably about 66 percent of those who had abnormal

cholesterol, about 40 percent of those individuals had a lipoprotein analysis.

Twelve percent of the people with an abnormal cholesterol had evidence of either a nutritional consult or a nutritional trial and/or had been placed on medication. On the order of 75 percent of those individuals were on lipid-lowering drug.

So, clearly, in terms of improving practice patterns, we're doing exactly what the pharmaceutical companies would have us do, identify high cholesterol and getting right away on [static]-- Again, a lot of things we can do with education.

PAP smears, 93 percent of Active Duty women had a current PAP smear within the last two years. However, the turnaround time for most PAP smears on those that were abnormal, it took a full 60 days. There's the -- the processing time, but certainly, on average it varied from facility to facility, but again these are the types of things that you have to look at.

In terms of there we did is we also looked at three specific factors -- Again, these women were Active Duty -- alcohol, tobacco and

STDs in the medical records. Thirty-six percent of the medical records had annotation of alcohol consumption patterns on the medical record. For this population we got 100 percent, at least asking the question and recording somewhere on the medical record what is the level of average consumption.

Seventy-four percent of the medical records had an annotation somewhere in the chart about smoking. So 25 percent of them had no information that we could find on tobacco use.

In STDs we used, you know, either evidence of either counseling or a more hard endpoint that we looked at was an individual with two or more STDs. Is there evidence in the medical record that hepatitis-B vaccination was either offered or received? We were able to find that in 29 percent of the patients.

One other point with the alcohol: When we looked at either emergency room visits or visits for trauma or for injuries, what we found is -- you know, and once again is that a universal question should be asked about alcohol use. In almost 60 percent of the records we were able to document that alcohol was being asked

about at the time the patient was presenting with trauma or injury.

So very interestingly, many of these norms, believe it or not, are very close to what national averages are as it relates to these indicators, which is the whole reason that health care plans are focusing on them in the United States.

We can go into much more detail, there's much more I can tell you about this study, but for those of us, Captain Trump and myself, and some in the audience, it really represents the first time we've done a large scale annual report on quality assessment of [static] and as many of you know -- I see a lot of head-nodding out there -- when you start trying to be accountable for the whole gamut of out-patient care, you start getting methods around it [static] --

COL. FOGELMAN: I think the question of hepatitis -- STDs and hepatitis-B immunization -- did you look to see how many of those that had been offered hepatitis-B immunization were hospital employees?

DR. PARKINSON: I don't think that's

in there, but I assuming that it was done --

COL. FOGELMAN: Okay. I just wondered. Because, well -- never mind.

DR. POLAND: You have then seen the numbers for the two-year-olds?

DR. PARKINSON: Well, our two-year-old immunization rate overall -- and again let's talk about the methodology. Basically, what we did is we used the medical record where, by DoD policy and just best policy, there should be a record of immunization in the medical record.

We also took a subsample of about 400 parents and did telephone interviews in which we once again asked for the shot record, if they had it, to see if it corresponded to what was in the medical record.

Overall, using medical records, we found that there were [static] -- 75 percent of two-year-olds -- three-fourths -- had been immunized. When we combine that with the questionnaire data, it may be as high as 85 percent, but it certainly is not 95 percent or 100 which we would want [static] --

DR. POLAND: Which may not be an accurate assumption.

DR. PARKINSON: Well, there's many variables; those are just -- I'm just saying that the main variables -- are a part of our estimate.

DR. SCHAFFNER: I think that picking the logical point for two-year-olds -- [static] -- 24-month-old survey for this [static] --

DR. PARKINSON: The other thing was, clearly, as the methodology evolves -- and CDC and others as national quality assurance -- one of the criticisms of this study at all is that while these people aren't "enrolled" in the sense that the National [static] Federation would probably look at. I argue back that I can assure you that people who come to our facilities consider themselves "enrolled" and they are using us for our health care plan to come and take care of them.

Part of it is an educational effort. As I said, we can make copies of the report available, and try to shoot for a lot of new things.

CHAIRMAN FLETCHER: Very good. Thank you, Mike. I think this just emphasizes the force of primary prevention with respect to cholesterol, and many around the table know the

importance of certain studies showing the importance of keeping cholesterol normal to prevent cardiovascular disease in the primary mode.

So I think we have a lot to put together here and, hopefully, we'll have it done very soon.

Any comments or questions, more on this?

COL. FOGELMAN: I have one comment, unrelated to what we've been talking about, that I failed to introduce Dr. Tim Finnegan. He's going to be our new British Liaison Officer, replacing Dr. Leach. So, welcome.

I'd like to take a break. Let's take a break, unless anyone has any comments or questions, until about 2:15.

CHAIRMAN FLETCHER: We'll hold the executive session.

(WHEREUPON, the Board recessed briefly at 2:03 p.m. and reconvened at 2:17 p.m.)

EXECUTIVE SESSION

COL. FOGELMAN: If I could possibly have just a few seconds of your attention. First is that you see we gave you a copy of

"Communicable Diseases." Nancy, you can do your own staff work from now on. Not really.

The second thing we gave you is a CD-ROM which is produced by some folks at AFMED, but there's input from all the preventive medicine services -- I mean groups in each of the services, and it includes a lot of useful information from virtually every country in the world to which the military has anything to do with, and it also has some manuals. Does this version have any of the manuals in it? Do you know?

CAPT. TRUMP: I don't think so, no.

COL. FOGELMAN: Okay. Well, upcoming versions will have some manuals such as field sanitation manual and a few others, which you can -- It's got a copy of ADOBE Acrobat in here so that you can use -- you can actually put that on your computer and use that to read the disk. It's got maps. It's really a nice reference. So we're going to give you a copy and --

DR. CHIN: Is this the second edition of their CD-ROM?

COL. FOGELMAN: I think this is the second.

CDR. ARDAY: Yes, this is the second one on CD-ROM.

COL. FOGELMAN: Right. There's going to be another one coming out probably. Do you know when?

CHAIRMAN FLETCHER: Next December.

COL. FOGELMAN: So I think we gave you a card and, if you want to put your name on the mailing list, we can probably do that.

CHAIRMAN FLETCHER: Here's the evolving honoraria.

COL. FOGELMAN: So if you have something where you can use the CD-ROM, you have to take a look at it. I think it's very useful.

I wanted to tell you that, regrettably, Dr. Wolfe sent me a letter last month saying that, due to health reasons, he was going to have to resign from the AFEB, which is why he's not here today. So for any of you that know him, he's still working some, but he's had to drop some of the commitments that he's had, and the AFEB is one of them. So if you know him, you may want to give him a call and say hello and that you're sorry to see him come off the subcommittee -- I mean off the committee.

We also are going to be setting up a new subcommittee of the AFEB on medical surveillance -- Pardon? Health surveillance. Okay, health surveillance to look at providing some guidance for developing a DoD surveillance program, bringing things together, certainly.

Dr. Perrotta has volunteered to serve as the head of the AFEB portion of that subcommittee. It will also consist of military members. Dr. Chin has also volunteered his services. So we'll probably have one more member of the AFEB as a member of the subcommittee. If anybody has a burning interest to be on that subcommittee and has experience in surveillance, please let me know, and we'll see if we can't help you out. Yes?

DR. CHIN: I'll be glad to participate in the health surveillance group, but you and I discussed something about global surveillance. That's two separate surveillance systems, I think.

COL. FOGELMAN: Well, okay. Maybe it was definitional and, if I said "global surveillance" I probably was saying "global surveillance" because that's the name of the

committee that we have had here within DoD. Really, what we're trying to do is define a DoD health surveillance system right now.

DR. CHIN: But there's a separate global surveillance, or are you trying --

COL. FOGELMAN: Yes. There's a separate global surveillance. Well, let me know. We can talk afterwards.

That committee will stand up fairly quickly. The other thing is there will be a time commitment. We'll probably have at least three to four meetings outside regular AFEB meetings over the course of the next year. So if you don't think you can devote the time, please don't volunteer, because it won't help us.

That's all, really, I have.

CHAIRMAN FLETCHER: The first issue for the executive session is the sickle sell trait issue, and we have the guide, at least the recommendations or comments, from our expert this morning, Dr. Kark. Vicky, what do we need to come up with now, a statement of we recommend, we don't, the commentary or what do we need to have in response?

COL. FOGELMAN: Well, I think, as Mike

was alluding to this morning, probably just a simple letter saying we don't recommend screening may not be enough. We probably have to come up -- need to come up with a package that discusses why or why not we're making the recommendation for screening.

Mike, do you want to elaborate on what you said this morning?

LT COL. PARKINSON: Whenever you get a question, you want to know where it came from. The history of this question was the Air Force, and as you looked at it, it had several bits, and I don't know the exact question or the exact numbers; but the bottom line is if that raised the level of the four-star who's in charge of Air Training Command and subsequently talking to the other services he found out that it was across the services, he then went directly to the -- actually, went to the [static], because the increased visibility and sensitivity to any recruit that gets in the Air Force is unacceptable and [static] --

So all I was saying was that in this case I will need a reasoned, powerful, concise, sellable argument to the one on this variation

that Colonel -- was talking about that we don't make. We make recommendations, and the line makes policies, and for that reason I think we have to speak to that.

I think, as I get down to the bottom of this, the types of things that are in the second to last recommendation are very useful. A couple of observations: I think, number one is that all the military services have increased the intensity, and in our case, the Air Force, the duration of our physical fitness training. The Air Force is discussing -- [static] -- higher than they were before, number one.

Number two, if it's not in here, I think we also ought to mention it, and that is that the cohort from which we're drawing of recruits nowadays is the most unhealthy cohort in the last ten years. The average fitness level in young adults is going down. Sedentary lifestyle is going up, and obesity is going up. Therefore, we have to be extra-vigilant.

Number three is that the science of our regulations may have to be reviewed in light of what we're seeing, if the bullet, number one, is true, that basically most all or almost all

sickle sell trait- related sudden death -- [static] - can be prevented by attempting to -- [static] --

That's not the language, and at some level some baseline risk for sudden death in our population does exist below the level of other deaths. Those types of things are all being "whereases" -- such that we then recommend that we don't see any value in them. These other bullets may be used for that; That, if it were the format of the document, would be very useful. Listing whereases, da da da da da da...

-- [static] -- "...so therefore..." -- [static] --

I also think, you know, the current practice -- speaking for myself; I don't know what Col. O'Donnell would say -- I don't feel real secure that, given all the caveats that Dr. Kark talked about, about -- [static] -- that our surveillance systems allow us to say definitively that in ten years you have -- [static] -- in the Army and Air Force. That was the problem I had with that statement, and that's the area -- [static] --

I know in our area one of the

recommendations that I made to Dr. Clark, perhaps, is that, if they do have a dedicated at AFIT -- [static] -- That would also make a commander feel better -- [static] --

CHAIRMAN FLETCHER: So stay with no screening but qualifying it with certain things that might possibly have a window for an exception. Other comments?

DR. LUEPKER: Let me ask Colonel Parkinson a question about what he said a little earlier. As I understand, the Air Force is the only service that currently does screening.

COL. PARKINSON: The Navy and Marine Corps.

DR. LUEPKER: The Navy and Marine Corps. Okay. And you said that when people are found to carry the trait, then they are given counseling. They are not given a medical discharge, but they are given counseling.

You seem to imply the counseling was kind of not very strong.

COL. PARKINSON: Since we're in Executive Session -- I asked them for exactly what they did with the recruit when they do it, and I received a piece of paper that read more

like Harrison's than it did anything that an average layperson could understand. I couldn't understand what it meant.

DR. LUEPKER: I guess the question is, if indeed that you're not screening for a medical discharge and the subsequent intervention, I suspect, are things you would recommend to all of the troops and all the commanders that are training recruits about what we're talking about, then what is the purpose of the screening?

COL. PARKINSON: There is a small number, and I don't know the exact number of people, who are informed that they may disenroll, voluntarily, based on that information, which even makes me more nervous, given that the level of information of this commander is not very clear, but there are some individuals under this policy, and probably also in the Navy -- I'm not sure, but I know in the Air Force, there are individuals who have elected to leave basic training.

Clearly, this is more -- you know, the whole policy of doing this is more perhaps reactive, and it's meant to be protective of the individuals. You know, my point in this whole

issue was how many other conditions are not as visible through a blood test that also place people at risk that we're not able to counsel them for. Even if we could, would they elect to?

DR. LUEPKER: What happens to the people that are homozygous?

COL. PARKINSON: They get picked up at the MEPS and never allowed in.

DR. LUEPKER: So they don't --

COL. PARKINSON: So one of the issues the Air Force commander -- what he wanted to do was to say, "screening is necessary, because these people are dying, and I don't want them to die" -- for the right intent; and therefore, what we want to do is we want to get everybody screened up at the MEPS so that, as far as, you know, if this is a risk and I can show that people with sickle cell trait are 20 or 30 times more likely to die -- and once you get that point, you don't get beyond that point.

It's the same thing we find in the newspapers, with relative risk for the "disease of the month club," except now it's been elevated to the level of Chief of Staff of the Air Force.

He knows it's a 30-fold risk. And you're telling him he's not supposed to do anything about it? The Air Force's response -- by the way, Health Affairs is going to say, "Let's back it up into the MEPS, because if it's that great of a risk, why aren't you, DoD, having a consistent policy?" so that, you know --

DR. BROOME: Just a clarification. You're saying that, in fact, this valence has not been homogeneous for the prescreening and the post-screening period in the Air Force and Army, and also the Navy; hasn't screening over these time periods, so that the conclusions about there being a decrease in deaths in the Air Force and Army and no decrease in the Navy are really not things we can put a great deal of weight in?

CAPT. TRUMP: When you're in the working group last year, trying to get a mortality period is difficult. In the briefs last year, Dr. Kark brought up a lot of difficulty with making a post-mortem diagnosis that tied sickle cell traits to -- making the diagnosis of sickle cell trait post-mortem may be very difficult.

One question might be, if we're not

doing routine screening to know who is sickle-cell trait positive or negative, it may be difficult to make that diagnosis or make that association for any death that occurs.

We do know that the sudden deaths are coming down in the services. I think the other thing that has definitely changed for all the services -- We talked mainly about the Marine Corps, but I think it's true for all the services, is that heat injury is being taken much more seriously, much more aggressively, that any -- and another thing to add to any statement coming out of here, that is the preventive measure that has to be stressed.

That is the thing you can do that will prevent any sickle cell related sudden death, but you know, it's significant to reduce all the other sudden deaths that take place during the training, too.

There were just a lot of uncomfortable people at the table last year talking about deaths, which ones could or could not be related to sickle cell trait, and the number of deaths being very small that were even in consideration.

DR. GWALTNEY: What's the major problem with the screening program? What's the major problem with doing it?

COL. O'DONNELL: You have two problems: first is cost -- which is something we didn't talk about -- you have to ask the question, does it achieve anything? Of course, it doesn't achieve anything in the Army, because we don't do it, but it doesn't cost us anything either.

I guess the question for us would be, if you were to implement it, would we gain anything? I think there's reasonable skepticism that we are, because in theory we are already doing what one can do with that knowledge, which is protecting everybody from the risk of training-associated heat injury. I can say that.

DR. GWALTNEY: Well, I'm usually at the other -- I'm usually the one that's the benefit of all the experts' advice in my medical center, and you get all these directives to do this and do that, and they're all well intentioned or most of them are; but if you did all of them, they would drive you crazy, and you would never get your work done.

So I can appreciate that other side of it, cost aside, and I would think that would be one thing. I don't know how many things you have to do with your recruits, but I know there are many, many, many things, and this is just one more thing which interferes with basically what you are trying to do, which is train them.

But on the other hand -- So I'm very sympathetic to the problem that you just don't want to keep adding everything to your training program. On the other hand, it seems to me you have said that nobody disputes the fact there is a 20-30-fold increased risk.

Those data seem to be fairly solid, and there is the undisputed fact that, if somebody knows they're at risk, they may take these things more seriously in their own personal training, and that seems hard to get around that part -- that point.

If they're not being counseled properly, that's a technical problem rather than the other. So having -- and as you say, you're not going to do anything with your training program in terms of putting the stress on preventing the heat-related injury.

So you're not changing that, but you are giving that individual a piece of knowledge which, for some people, could be important, even though it's very rare, and that's kind of hard to get around, it seems tome.

LT COL. PARKINSON: One of the questions I had was, once you've done whatever you can to maximally immunize the person from heat-related whatever, if exertional deaths of all sorts are greater in sickle cell trait individuals than non-trait individuals, and you know that information is true -- so that 21-fold increase, that's from a wide variety of studies, you know, etcetera, etcetera -- then what is the duty to warn when the rate is one out of 5,000?

Clearly, you know, looking at everything else on the list -- Now if you happen to be that one out of 5,000 and if you had known about it and you chose to lead a vigorous physical training program, which is what some of our folks do, or if you were to say, well, then everybody drinks one canteen, you drink two, and you specifically have to immunize yourself more -- I mean, that is a conceivable outcome of a screening and advice program.

Of course, we're testing that hypothesis with two per -- you know, one per year, you'll never get the data on that one. That's the horn of the dilemma. I think you said it very good, and the commander is saying, "why wouldn't I want to tell somebody if they would be at risk?"

DR. GWALTNEY: I'm not sure it's "drink two canteens," but it's "make sure you drink your one canteen," assuming that's your program; and if some individuals are making a decision that they want to drop out, then that does show it's having an effect for some individuals. It's tough.

DR. BROOME: A risk of one per 5,000 of death is pretty high, I think.

COL. O'DONNELL: But it's considerably less than the lead risk of death -- which, I'm sure, among our people, are many -- about which we don't do anything.

DR. GWALTNEY: Well, such as what?

COL. O'DONNELL: Trying to prevent motor vehicle accidents --

DR. GWALTNEY: But we just heard all these programs. We're trying to prevent those

things.

COL. O'DONNELL: Well, we know it's a problem. That's true.

DR. GWALTNEY: Well, we've got to get them to wear seatbelts, and not drink.

COL. O'DONNELL: I'm not sure I know what we can do to stop vehicle accidents.

LT COL. PARKINSON: Well, I mean, there is a certain internal inconsistency here. I mean, we do not routinely administer CAVE instruments to recruits to find out who are problem drinkers. We should probably do that.

DR. GWALTNEY: We should, yes.

LT COL. PARKINSON: This opens up --

DR. GWALTNEY: Yes, we should, as you just said.

LT COL. PARKINSON: If you want to put in terms of public health approach in terms of risk of death in the first two years of service, I mean that's exactly --

CHAIRMAN FLETCHER: Commander Sharp.

CDR. SHARP: I had a question. I thought for a second you said something like, " if I do this screening, this might be identification of other hemoglobinopathies" that

[ ] --

CAPT. TRUMP: That could be a secondary benefit. You have to be discrete in this. One benefit of going to screening is identifying people who truly may be at risk -- [static] -- I think the other underlying issue, that is, there was a great deal of concern as far as sickle-cell testing, and that it could be viewed as a discriminatory policy, either in the testing itself -- and that's actually, I think, what generated some of the differences between the services ten years ago when there was actually a backing off of what was a more stringent policy so that it's not -- you know, it doesn't affect assignability, but concerns that even through testing through a specific counseling that you're essentially discriminatory, or could be putting a burden on some young recruit to make a decision about what they're going to do with that information, that they may not -- you know, because they know their sickle cell-test is positive, they're told that they may be at higher risk, they may not push themselves as hard. They may not be as likely to, you know, push themselves to succeed compared

to some others.

CHAIRMAN FLETCHER: Dr. Lee?

DR. LEE: Yes. Just from a statistical viewpoint, I have trouble with 25-fold higher risk or 21-fold higher risk. I think we just looked at Dr. Kark's presentation this morning. Seems to me, they only look at one variable, you know. Really, they're just univariate analysis.

I would not jump to the conclusion that these 21-fold or 35-fold are really real. I don't know at this point. They didn't consider any combining factors or other variables that might affect the results at all. So I'm not sure whether these numbers are conclusive.

CHAIRMAN FLETCHER: Dr. Chin?

DR. CHIN: Point of information: Is G6PD screening sort of uniform in all of the services, and is there any counseling and follow-up of G6PD testing?

COL. O'DONNELL: Well, once again, the Army doesn't play. We don't do it, but I believe the other two services do.

LT COL. PARKINSON: We do G6P.

DR. CHIN: Aren't there some contraindications of taking certain medications

if you're G6PD?

LT COL. PARKINSON: It's relative, relative contraindications.

CAPT. TRUMP: Probably the most military- unique one is malaria prophylaxis.

DR. CHIN: And in the Army, you don't pay attention to that?

COL. O'DONNELL: Well, essentially, no. It turns out that we don't have an adverse experience with it. It turns out that the portion of our soldiers who most likely have G6PD deficiency are African Americans, and their type of G6PD deficiency can tolerate exposure probably pretty well. I think it's the Mediterranean type or something.

Though I'm sure it's happened, I must say, I have never heard of a specific case of someone in the Army -- it probably has happened, but it's a -- turns out to be a non-issue, I guess.

DR. GWALTNEY: What about making it optional, the testing optional? Now don't laugh. You've made the vaccines, the tick-borne encephalitis, optional. I mean, the principle is -- I know in the military you don't like a lot

of things optional, but that is one thing that is optional, because you say, if you don't want to sign the consent form, you don't take it.

CHAIRMAN FLETCHER: Dr. Luepker.

CDR. ARDAY: Yes. That's because of all the political fallout from Desert Shield/Storm where the press was full of all these reports of the military forcing people to take investigational vaccines. I'm referring to the Botulonin toxin vaccine.

DR. GWALTNEY: This has political implications, too.

DR. LUEPKER: Colonel O'Donnell started on something that I'd be curious to learn more about. I mean, the Army has a different policy, ignoring whether there are differences in basic training for the moment.

I mean, you've got a natural experiment here. You don't screen these people and presumably you don't do post-screening education. Is your experience different?

COL. O'DONNELL: Well, I think that may be the appropriate problem. I think Dr. Kark is the one who said that the Army had gone ten years without a death due to sickle cell trait,

and I find that amazing. I'm not sure I believe that, even though I'd like to believe it -- [static] -- Despite positive response of the services in terms of trying to minimize the risk to basic trainees, I get the sense that lot of us may try and get the word out, but the turnover in generations of trainers, is so significant I find it hard to believe -- [static] --

DR. LUEPKER: So you suspect the data. That it's being classified differently?

COL. O'DONNELL: Well, I do. I hope it's right, but I have to remain somewhat skeptical. I tend to believe that there's no differences between the services, despite their policy -- not that the Army's doing that much better. -- [static] --

DR. LUEPKER: But is your overall death rate among the troops from all factors any different from the other services?

COL. O'DONNELL: I don't know.

LT COL. PARKINSON: I'm trying to peel away the layers of the onion here. I could personally build on it, you know -- [static] -- I was not a member of the working group and kind of worked around the periphery.

If, basically, we have a marker -- and Dr. Lee's point, that it may not be the marker, that it may just be a confounder for other types of things, but this marker, at any rate, has been shown in study after study across a long period of time to be associated with increased risk of sudden death. Whether that's the marker or whether it's -- I mean, in a way, in my own mind, it's almost a moot thing.

I mean, if you said we found a better marker, it would be a marker for increased risk of sudden death; and if that is true, despite -- despite every attempt to control environmental conditions in basic training, because at some low level, you know, there is always going to be an SCT individual who is at risk for sudden death.

Then is there a responsibility to basically identify that individual and allow him to make an informed consent about whether or not he wants to participate in a situation that, for him, would put him as an individual, although as a macro picture maybe not the whole population as a whole -- that would put him at risk.

The more I think it through, if the science is sound and if we maximize our

opportunities for that individual to basically prevent having environmental conditions -- you know, agent/host environment -- I think I've got to identify that individual at some level early on in the process, long before he gets to basic training at Lackland, and give him that opportunity to do that.

Now, this is just a harbinger of two other issues that I think the Board has to weigh in on, and you're probably aware that there is a DoD Accessions Board that is looking at the entire epidemiology of how we access people in the military and what is the content of clinical examination, and the laboratory tests that need to be done.

So our goal in the Air Force is to drive it all down to standardization except for those operational things that are used in the services -- So everything should be at the MEPS -- Now MEPS will come back and say, "there's no reason for us to do that stuff, because essentially we have to spend a lot of money on people who would never make it through the MEPS process anyway, and why don't you do it when they get there?"

So it's an economic argument in the MEPS; but if it's a principle of true risk, the military will do their best to control it, but it's a risk, nonetheless. Then maybe we need to identify it at the MEPS, particularly if it's in the -- not the present political sensitivity but I don't want to spend -- I don't want to -- [static] -- another two years. I mean, it comes up every three to five, ten years, and the science basically says the same thing.

CDR. ARDAY: Well, I think there are two things that you hit on there that strike me. One is how true is this risk. We've got this 21-fold number we've been throwing around today. Those are, as my recollection from this data -- and I don't have copies of the slides -- those were population-based studies. They were the broad base, and they didn't involve -- They were prior to the implementation of a lot of the -- Okay, that was this 21 percent.

I'm trying to think of what the -- Yes. He came and said that most of the stuff would be controlled by hydration and doing these things to relieve heat injuries. So the question is, I guess, what would be the relative risk in a

population where that has been implemented?

He didn't really address that question, and maybe from one of those studies we could get that estimate.

The other thing, I think, that comes to mind is this business with the MEPS. The MEPS, of course, are screening sickle-cell, people that are homozygous, SS -- hemoglobin. That must be a different test than the test for --

LT COL. PARKINSON; I'm not sure they do that, because by the time they're 18 years old, sickle-cell doesn't just crop up. So these people are already --

CDR. ARDAY: Okay, because that would be my question, if there was just something, adding another test. You're right. They probably aren't doing anything at all here to screen that. So it would be just start from scratch. Yes.

CHAIRMAN FLETCHER: Other comments, questions?

LT COL. PARKINSON: Fifth bullet down there, just to show you, though, despite screening for SCT, the Navy continued to show a

35-fold higher risk in the period '82 to '89 when they optimized their heat- prevention program -- So implicit in here is that even beyond the baseline, they're going to have more heat deaths in that population.

That's the question that I just have to answer -- [static] --

CHAIRMAN FLETCHER: Claire?

DR. BROOME: I guess I was a little disappointed in Dr. Kark's presentation, and there are two particular areas. One is, for example, in this listing of studies for the assessed risk. There's no confidence intervals to relative risk. I mean, certainly, they're very consistent in five different -- apparently, different studies with, you know, similar orders or magnitude.

Even though, you know, with the univariate analysis and you're projecting people who actually have sickle cell trait by a different methodology, I tend to doubt that there's a confounder that you'll be able to identify which would really explain that magnitude of risk, and you also do have the number of studies of the physiologic rationality

of the SCT being the explanatory theory.

So I suspect it's true, but I think it's -- [static] -- the CIs for those studies. Some of them are based on very small numbers, but overall I guess I'd be willing to say there probably is this relative risk.

Then I think Mike Parkinson's logic and -- really follows, that even if overall the risk is decreased by heat exertion policy, for any individual person their particular compliance with aspects of that policy may be influenced by the knowledge of the risk in their status, and under that circumstance, it seems appropriate for them to have the opportunity to be aware of that.

You know, so assuming that, in fact, CIs are clearly being no effect -- I would be trying to force screening and counseling -- [static] --

And it is unclear whether, in that instance, I would think, the real chance of confounding -- I mean, you've got hot weather -- do they look at -- post-days, associations -- [static] -- I would have to see the data.

CHAIRMAN FLETCHER: Bill.

DR. SCHAFFNER: I guess I'm moving

sort of in Claire's direction. One thing about it, which is, if the Army experience is true, then no matter how high the relative risk, you can do something about it in a very effective way, and I wish that we had more confidence in those data, because that would influence me a lot, because absent that confidence, the decision what to do after screening then becomes an operational decision.

We can either decide to counsel and say, "All right, the principal responsibility here is yours as an individual;" or you could decide this relative risk of death is so large that it's best not to take you into the military at all. I think both of those things kind of flow.

Those are operational decisions. You can decide what kind of relative risk for any adverse event you can accept for the people whom you admit to this elite group with a specialized function.

So I could understand that, and I think I have a certain sympathy for the commanding officer here. If this is going to be a big problem that we can't impact, let's not

take them at all. I mean, let's handle this in a humane and appropriate way on the front end. I mean, that logic follows.

DR. GWALTNEY: My own personal opinion is that, when you volunteer to serve your country, you assume certain risks, and if you have sickle cell trait, this is a slight risk you assume; but I don't think that will sell.

I think that's the argument on the other side. I believe that personally. I would have said I don't think it will sell in 1996, but the more history I read, I think people were the same 100 years ago, too. They sounded more patriotic, but they had their same things they thought.

So that I just -- My feelings on this are not my own personal feelings, because I would say this is a risk. You joined the service; you take on certain risks. I was in the service, and I felt I did. That was part of the deal, but I think you will have this over your head forever and ever if you try to take that view on the thing.

So I think, from a political point of view, it's better to do the screening, and I

think there's some ethical considerations, too. You can come down on the other side.

CHAIRMAN FLETCHER: We may not be able to resolve this. I think -- At this point, I think -- It's like I wrote in a preliminary letter to Dr. Joseph, how many people who come in the service have a obstructive-cardiomyopathy. That's not accepted. Echocardiography will pick this up. We can't do it.

It's just a lot of areas of concern here. I think we can talk for as long as like. I think the Committee on Wellness has to come up with some draft or response of some type. I don't know if we can really change the policy, but I think we can talk as long as you like today.

COL. FOGELMAN: Do you have comments?

(UNIDENTIFIED OBSERVER): I'd like to present a viewpoint that has been touched on but, I think, is very important. I think that we need to consider the individual as being as important or perhaps more important than a lot of other things we've been looking at.

What we're talking about in many cases amounts to adolescent medicine, because we're

dealing with 17 and 18 and 19-year-old people; and if we do a test at the MEPS station and MEPS is not known for -- with these people or for its ability to make a lot of important decisions about what is important and what isn't, and we have people who are coming in motivated and trying to do something about their life and we tell them that there's something wrong with them, and we don't follow up on that.

We don't adequately counsel them. We can't explain to each other here exactly what it means to have a positive test, and I can't understand how we're going to explain that to a 17 or 18 or 19-year-old.

I think that we run a great risk here of imposing a sentence of lifelong disability on someone. I think that's very, very important, because we in American medicine have destroyed a lot of people's lives with some of our concepts about back pain. I don't think we want to do it with something else.

There's a potential for doing that with the sickle-cell trait.

CHAIRMAN FLETCHER: Thank you. Russ?

DR. LUEPKER: I guess I'd like --

Since Lou isn't here, I'd like to add a bit to this. I think when we discussed this before, he made the point that this is a pathway for many young adults to a different life, and stopping them because of what is a relatively low likelihood disorder not only has political consequences, but it has social consequences.

You know, I think we obviously need to do whatever we can to make sure the preventive measures for hydration and other things during basic training occur, but I think screening folks, -- and ultimately people will start, for whatever reasons, "self-choice" -- to move them out of the service for this is a disservice, and some might even say sending young African Americans back to their neighborhood is more dangerous than their likelihood of dying during basic training in the services.

I think that, you know, this is a broader issue, and for me this would argue -- and everything I've heard would argue, contrary to what Dr. Broome just said, for not screening at all. I mean, you screen because you think you could do something that is ultimately beneficial, and I'm hearing a number of things that are not -

- that are going to be negative.

CHAIRMAN FLETCHER: Dr. Poland.

DR. POLAND: I'm going to make the point that, you know, for things that are very important to screen for, we do it, generally speaking -- unless it's some special ops thing, we do it whether they're in the military or whether they're not in the military, and we would never think to screen somebody for this trait if an 18-year-old African American male walked in my office, never think to do that, even if he were an athlete, just wouldn't think to do that.

The other -- Claire mentioned a point, which is a valid one, that there's some reassurance in seeing study after study showing the same kind of relative risk. There's also reassurance in year after year, ten years now, if I understood it, of not seeing any difference in the outcome of interest, whether you screen or don't screen.

So I have trouble accepting in my own mind that this is worthwhile to do. I don't particularly buy the idea that politics is a good reason to do it. I think reasonable people can be reasoned with, but I'm not reassured.

DR. BROOME: That's why I asked about the quality of the surveillance data. From what I heard, the way that the reported cohortS -- the way that the numerators were actually looked at for both sickle trait and underlying cardiac disease is very different than the essentially anecdotal reports of deaths in the military after heat exertion was minimized. Isn't that true? Is that what you're saying?

LT COL. PARKINSON: I was just reading from -- Precise enumeration of population at risk, a listing of all the pretests by the sources, remarkably detailed description of each death including eyewitness accounts of circumstances and clinical course, full autopsy protocols and full toxicology for greater than 95 percent of patients.

That's about as --

CAPT. TRUMP: But that has not been done for the last ten years.

DR. BROOME: Exactly. That's my point, but it was a very intensive study that resulted in these relative risks, but our confidence level in the fact that they have gone down, I don't think, is as firm.

Well, they implemented -- Let's see. He hasn't done anything since 1990. I don't think it's been in the last -- since 1990.

LT COL. PARKINSON: 1990 is when, I guess, the overall things were changed. The other thing is how many years you have to go before you get enough enumerator data to be able to tell that. I mean, there's a methodological problem, too.

DR. BROOME: Well, I think your idea of trying to get people to collect the information on these numerator events is very constructive and should happen.

LT COL. PARKINSON: Well, again, that was the first response back from the Board, and Dr. Joseph said, close no cigar, and sent it back. When you feel the packet, it's like interesting, but not more research. One thing -- Go ahead.

DR. BROOME: I actually think this is a fascinating microcosm of what we're going to wrestling with increasingly with genetic testing in general. I mean, this is the first step, but I guess I'd take -- If you accept that there is an increased risk of exercise related death --

and I'm mean, sure, I'd like to see the CIs, but it doesn't look bad -- then -- and we haven't heard anything to say that that relative risk would be less if you control the level of exertion. That's a major thing.

CDR. ARDAY: Well, actually, we do have that. I think there's some of that in this one series, the one that are reported in '94, the 1.6 million from four armed forces, which is the '82 to '86 period when some of the attention to heat injuries had been reported have been followed, at least in the Army and the Air Force, I think is what he said; and now you're down to 11.5-fold.

That may be the more accurate number rather than 21-fold or 23-fold.

CHAIRMAN FLETCHER: One thing worth mentioning: In Circulation this July will come out an article -- position paper relative to screening of the Olympic type athlete. What do we do? As I recall reviewing this paper, sickle cell trait was not mentioned, and the conclusion was we really don't screen athletes like this, particularly Olympic level, and many are Afro-Americans who might have this trait, and it was

just really not mentioned. It was not an issue mentioned.

DR. BROOME: But I think Greg's point was we don't do this for everybody, but we don't send everybody out to train, you know, under orders from the U.S. military at this kind of level. So --

DR. SCHAFFNER: That may be, Claire, but there are some rough analogies with football players, high school football players that start in our neck of the woods.

DR. BROOME: Right.

DR. SCHAFFNER: Certainly, in August. And there are heat related injuries associated with --

CHAIRMAN FLETCHER: That's voluntary to achieve.

DR. SCHAFFNER: I think the principle is a generally good one. If you screen, you ought to know quite definitively what you're going to do with the positives that you find, and I don't think we've heard the definitive answer. Absent that, my inclination is to suggest don't screen, and give even more attention to avoiding heat related illness in everyone.

DR. POLAND: And also doing what Claire suggests, if I understood your comment. The concern is that the numerator over these last ten years may be biased by the fact that we had somewhat -- whether you asked it so that you got the numerator of ten years prior.

So it does kind of come back to the more research before we make a recommendation. What strikes me is we're typically in the --

COL. FOGELMAN: That's not an option.

DR. POLAND: Well, maybe not, I guess, but we're typically in the bind where we're doing something, and we're asked whether it's the right thing to do. The advantage, I think, we have here is that in one case we're doing something, in one case we're not already now, and have the opportunity to get that data and make a decision that has social and moral implications, but it also has a million dollar a year implication or more, if you're going to do it at the level of the MEPS.

CDR. ARDAY: Another implication, I think, is that, at least among African Americans where the trait is 5-8 percent, we exclude people who have asthma. We have all these other

exclusions, and eight percent doesn't sound like much, but when you start adding it on all the other exclusions, now we're talking about maybe 30 percent of African Americans aren't going to be eligible for the military.

DR. GWALTNEY: Well, I don't think anybody is talking about excluding these people. That's not the issue.

CDR. ARDAY: Well, a couple of people have mentioned it as a possibility, that maybe we don't want, you know --

DR. GWALTNEY: I didn't hear that.

CDR. ARDAY: That would be an outcome of the screening.

DR. GWALTNEY: I didn't hear that suggestion.

CHAIRMAN FLETCHER: Screening only. What happens after that?

DR. GWALTNEY: The individual then has -- As I understand it, there are two things. The individual then is given the option to resign from the service.

CAPT. TRUMP: That was the Air Force only.

DR. GWALTNEY: Okay. And the

individual is then aware they've got a condition which, if they are stressed with strenuous, protracted exercise, so many METs, they are greater risk than someone who doesn't have the condition of having heat related sudden death, if you believe these figures, and they know that.

CHAIRMAN FLETCHER: Mike.

LT COL. PARKINSON: I think Dr. Broome is right on. This is just a harbinger of things to come. What you're able to identify, a marker -- who knows whether or not it's a problem or not, but a marker for elevated risk of something at some future period down the road, you know. What's the obligation to inform?

I would just say that, if the Board does come out and recommend screening, I would very much want the Board's input into what is the handout or the controlled form of counseling that goes to the individual.

You know, if I'm sitting down with -- here and saying, okay, dear Joe -- but I think that's part of it. I'll tell you, with the Air Force, we really are grappling. If screening, then what? So it has to be both.

CHAIRMAN FLETCHER: Claire?

DR. BROOME: I think the issues are enormously complicated, but I don't think we can just say because they're complicated, we don't tell people. I mean, sure, they're adolescents. That's going to be very hard to explain. Sure, there's a possibility that they will interpret it as their being disabled. Sure, there's a possibility that they will say they can't do more than walk or whatever, but none of those, to me, excuse us from informing somebody about a potential risk that you've identified.

It makes it totally crucial as to how you explain that and try to put it in context of what does this mean and, you know, there are definitely things that can be done in terms of hydration and paying attention to heat indexes and whatever; but I think it's possible to explain that to a 17 or 18-year-old.

CHAIRMAN FLETCHER: Bill?

DR. SCHAFFNER: A foolish consistency is the hobgoblin of small minds. I'm very taken with the comments about what other conditions currently are being used as indicators for not accepting people into the service, and I wonder what risks those conditions give to the

individual as opposed to this one.

Is this out of line in some way? Are these other risks of disability -- This is a risk of death. Are some of those risks for the long term consequences and, therefore, the cost of medical care, as opposed to immediate risk of death?

If this is going to be used in a construct with other exclusionary or cautionary indicators, I'd sure like to know how it fits in, in the magnitude of the impact.

CHAIRMAN FLETCHER: So many of those. Normal heart murmurs -- how many did I send home in two years with the Marine Corps Recruit Depot at San Diego.

CAPT. TRUMP We don't disqualify smokers.

CDR. ARDAY: We do disqualify alcoholics if we know about it, but --

CHAIRMAN FLETCHER: Any other thoughts? Anybody have a thought?

CDR. SHARP: It's not as if screening is not done, these people don't get this advice. I mean, if you go to Marine Corps Recruit Depot, it's not just casually mentioned, pay attention

to this heat business stuff. I mean, that's, you know, a very important issue, and so in the absence of screening, the same advice that would be given in a counseling session is actually given quite a number of times and reinforced extensively normally. So -- Yes, exactly.

DR. BROOME: But one of the up-sides of genetic testing is people may pay a little more attention if they understand this really means you. I mean, you know the difficulty of getting people to listen to what you tell them.

DR. SCHAFFNER: That's a nice idea, and --

COL. O'DONNELL: You raised the -- You also mentioned the possible negative effects of the counseling. It sounds like the old smallpox vaccine, you know. When the risks of the intervention is greater than the natural risks -- and I don't have any quantitative data on either of those, but I dare say you could scare the bejesus out of people a whole lot more often with a serious counseling thing about a potentially fatal condition than you could actually make a difference in their longevity.

CHAIRMAN FLETCHER: Greg?

DR. POLAND: One other thing to bring up: If this is in the realm of genetic counseling or genetic testing, and I think it's fair to say that it is, do you have to get consent then to do that? Right now, DNA is collected, not tested but just collected, and there's a law suit over there. If you're going to systematically do genetic testing, you have to get consent.

LT COL. PARKINSON: I was just about ready to recommend that, when you don't know what to do, you get an ethicist and it really confuses you. It's part of this broader issue about the accessions physical. Quite frankly, a political climate in which one of these may be Ted Koppel, I mean, you know, going to go next week in the Air Force.

So that doesn't change what right thing to do, either medically or ethically, but you got to kind of walk the issues around. I agree.

What I think is that we should have been informed consent back 20 years ago, because by definition one of them is going to be abnormal, and we're going to go down a

diagnostic, you know --

DR. POLAND: No other genetic testing you're allowed to do without a consent form.

CDR. ARDAY: The other idea -- I don't know if we have any data on this, but Brandon Braden suggested it to me -- from Desert Shield/Desert Storm or other time when people go into MOP-4, obviously, that's a very heat stressful situation. Do we have any indication that any people with sickle cell trait fall out more frequently under those type of circumstances, heat injury in the act of duty?

I mean, if we can show that there's nothing there, that would be another thing to support the fact that the screening doesn't really give you any benefit.

COL. O'DONNELL: I don't think there's any data, and I understand that the question really does relate to basic training. We're home free once they're out of basic training. Even if there is an increased risk, that hasn't been thrown on the table yet.

COL. FOGELMAN: I'd like to recommend, if you don't mind, that the Health Maintenance Subcommittee with Dr. Parkinson and anyone else

who is interested in giving a viewpoint kind of has this out when we break out to our subcommittee sessions today, and then come back with a draft, which may or may not be today. You may be getting FAX'ed the draft for comment.

We do need to act on this within a fairly short period of time, because there's some people waiting for this response, whatever it may be; but whether we actually finalize it today or not, I'm sure if we finalize it within a couple of weeks -- Okay. Would that be all right with you all? I'm not trying to stop the discussion here, but we do have some other things we need to discuss.

LT COL. PARKINSON: That's all right. I think this is one we're going to get down to votes, to screen or not to screen. I would ask -- I'm not sure if the Board is going to handle it through the subcommittee, but it might want to go to the full Board.

CHAIRMAN FLETCHER: I think we need to draft something and then bring it back to the full Board.

COL. FOGELMAN: That's what I'm saying. We need it come back.

COL. PATTERSON: What's the timeline here, Jerry?

COL. FOGELMAN: They want something as soon as possible. I would say --

DR. LUEPKER: Are we going to have more information then next week or a month from now?

COL. FOGELMAN: I don't think so. There isn't.

DR. LUEPKER: So we don't know.

CHAIRMAN FLETCHER: I think we can't say -- We have to have some contingencies, I think, like Mike says. If we're going to say no screening, we need to have some solid bullets underneath.

COL. FOGELMAN: They're waiting to have this proposed policy, DoD policy, and they've been waiting already almost a year, and they're waiting for the AFEB response.

CHAIRMAN FLETCHER: But we responded once last year. They want another response.

COL. FOGELMAN: Well, no. I mean, if you -- Nobody is saying -- You have to write what you feel. I mean, they're not going to -- and if it comes up the same way that it did last time,

so be it.

DR. POLAND: What can they do, fire you?

COL. FOGELMAN: I mean, that's what you're here for. He's just saying take another look at the issue and, if you can clarify it a bit further for us, then please do that.

CHAIRMAN FLETCHER: Last year it was essentially no screening was recommended.

DR. POLAND; Jerry, part of that clarification might be to point out legitimate areas of concern and problems, including genetic testing blah-blah-blah, and I don't think it is -- I don't think we should think in the box of we cannot give an answer along the lines of what we did before.

COL. FOGELMAN: No, we're not saying that.

DR. CHIN: There are such things as hung juries, you know. I wouldn't feel uncomfortable to just communicate that we can't come to an agreement.

CHAIRMAN FLETCHER: I think it may come to that. John Bagby? Yes?

DR. BAGBY: One thing that I haven't

heard in this discussion -- I may have misunderstood, but I thought Dr. Kark said at one point that he hadn't done any studies since 1992 but had heard that there were five deaths or something like that in the Army. Did I misunderstand that? I think he said something like that.

So that takes out that zero deaths in the Army as a consideration.

COL. FOGELMAN: I think he said more recent deaths in the Air Force.

LT COL. PARKINSON: May I suggest, though, that -- May I suggest a personal plea. I don't know if we're going to have anymore data than what you have here, which is ten or 15 years, given the dirtiness around the edges. I really think that groups such as the AFEB somehow has got to strap on these issues where you're not going to have 100 percent pure randomized control trials.

I would urge the Board to come back with something that is either thumbs up, thumbs down on the issue of screening, and perhaps maybe to approach it through the -- you know, Fred was saying does it meet the criteria for a screening

program, morbidity, mortality, burden of disease, as it relates to the specific military environment.

It's not going to be in the upper righthand corner of the Guide for Clinical Preventive Services, but in your estimation, knowing what you know about the military, does it meet criteria for a screening program, and then give them the bullets: Either they do screen and defend it or they don't screen and defend it, in that packet. You've got a kind of stand-alone thing, and then take the best shot.

You can always say, yes, more research, better --

DR. BROOME: Right. But Mike or Vicky, can we have Dr. Kark to at least provide CIs for this table with all the studies?

COL. FOGELMAN: Yes.

DR. BROOME: I mean, that shouldn't be -- That's not new research.

CHAIRMAN FLETCHER: Dr. Luepker.

DR. LUEPKER: You know, I agree with Colonel Parkinson, and I may extend what he said a bit. You know, we could always ask for more data and wait, and we may or may not get it in a

timely fashion.

I think, you know, we need to come to grips with this today, and we can take it to a subcommittee, explaining we won't come to grips with it, and I don't know whether it's a hung jury or not, because I don't know where my colleagues stand; but I think we ought to put it on the table.

COL. O'DONNELL: In the absence of a change in the status quo, you will have two services testing and one not. Maybe it's in that natural experiment. Then we should go on policy matters and get the good mortality data, which Dr. Kark said, I think, you really need to spend a little time and money on to really look at every death.

That's certainly not being done right now.

DR. LUEPKER: Well, if I'm going to look for more data and I didn't want to do the perfect study, I mean, I'd be very reassured to look at all cause mortality among the troops. I mean, if that's different in the services, then going up or going down, that would say a lot to me about how those recruits are being cared for,

and breaking that out by ethnic group, by race, would say a lot as well.

DR. SCHAFFNER: Let me ask you a question. Is the recruit experience the same in all the services?

(CHORUS OF NO.)

LT COL. PARKINSON: Likewise, they restricted the base, so many of the other causes that cause mortality in age groups, they're not availing themselves of.

DR. LUEPKER: So every service runs their recruits harder. Is that what you're saying?

CAPT. TRUMP: Marines are different.

DR. BROOME: No, we're the soft ones, and we'll admit it.

COL. FOGELMAN: But our cause is going to have a huge component of motor vehicle and stuff that, I would think, would sluff out.

CAPT. TRUMP: Just looking at, say, recruits, it should not, because they're not -- You know, whatever their period of recruit training is, they are recruits, and they don't --

DR. POLAND: Aren't there even significant differences in the length of

exposure, recruit training?

COL. FOGELMAN: Six versus 12 weeks in the Army.

CHAIRMAN FLETCHER: I think it's appropriate now at this point to maybe open the floor for a motion to make a disposition of this today, if someone is willing to. If not, I think it will go back to committee. Is there a motion?

DR. LUEPKER: I move that we decide this today.

CHAIRMAN FLETCHER: What do you move?

DR. LUEPKER: Oh, you want me to -- that we should take a vote on it, but if you want it to be extended further --

CHAIRMAN FLETCHER: I can't call the question until there's a question.

DR. LUEPKER: I will move that we suggest to Dr. Joseph that screening be suspended in the services.

CHAIRMAN FLETCHER: Is there a second? That we suspend screening.

DR. POLAND: May I amend that to say, and in the meantime continue to collect information. I mean one of the things that the committee, seems to me, has done sometimes, and

it's true that we don't always need a randomized clinical trial, but nor does it have to a "fire and forget" scenario. We didn't do that with JDD. We made a recommendation and a follow-up information so we could refine that recommendation. I think that would be appropriate here.

CHAIRMAN FLETCHER: Is there a second to the motion?

DR. LEE: How about also to continue the preventive?

COL. FOGELMAN: I think it's very important to --

DR. POLAND; If Russ would accept that amendment, I'll second that.

DR. LUEPKER: I'll accept that. I will accept Lisa's amendment, obviously, to continue the preventive measures for all the troops.

COL. FOGELMAN: It's very important, as Mike said earlier, in whatever decision you make to state clearly why you are making that recommendation, whatever that recommendation may be. It's very important to do that.

DR. GWALTNEY: If that's what they

want.

CHAIRMAN FLETCHER: Motion has been made and seconded to suspend screening in all branches, continue studies and general preventive measures. Is that correct, Lou? Discussion?

DR. GWALTNEY: And as Colonel Fogelman says, we need to give a reason to go along with what we decide.

CHAIRMAN FLETCHER: Yes.

DR. LUEPKER: Let me at least provide a couple of points in this discussion that weighed on me. I have no question, you know. I'd like to see more of Dr. Kark's data and where it came from, things like confidence intervals. I'd like to know what preponderance there may or may not be.

It's unlikely we're going to get that. I will accept that there is some increase in relative risk with carrying the trait, but we're not only here to discuss that. We're here to consider the role of the screening program and how it's going to be helpful or not helpful.

I would suggest on balance that it has the potential for doing more harm than good, and for me much of the bottom line comes from -- You

screen people because you think you're going to do something that will benefit them, that will improve their health or prevent or delay disease, and right now I don't see or hear what we would do different, other than kick them out of the service, that is going to have a lasting benefit for them or for the service.

I think that -- So I'm concerned about the counseling programs and where they might go and how people would react. I would also suggest there is a down side to labeling people. We all know that from screening programs.

I've had some experience in behavioral programs and some conversation with the literature or being conversant with some of the literature. You know, instructing late-teen, early twenty-year-old adults in things that may cause them to be unhealthy is chancy business, at best, not very effective, but for a certain subset can be very deleterious.

Labeling is a deleterious thing to a certain subset of people. So I think on balance, you know, given what we do subsequent to screening, it is more harmful than helpful. So that's the basis.

CHAIRMAN FLETCHER: Any other comments on the motion?

DR. BROOME: Point of information. Some of the services have been screening. Do you have any information on the effect of the information?

LT COL. PARKINSON: Following the deaths or several deaths we had, Air Training Command again is a line command we don't have to go through certain channels. They instituted a policy of the counseling and, when asked about that, they have several -- I don't know the exact numbers of candidates that's enrolled. Among other factors, labeling or whatever-- DR. LUEPKER: There is a small literature. It's with somewhat younger kids about labeling kids with high cholesterol and, you know, how they are treated by their parents, subsequently and adults around them.

There are issues of labeling kids with heart murmurs and heart defects. Heart murmurs frequently aren't --

CHAIRMAN FLETCHER: More often than not.

DR. LUEPKER: Yes. They're mostly

benign, and how they -- They wind up protected and acting differently toward sports and other things, probably for no good reason.

CHAIRMAN FLETCHER: For years. Dr. Gwaltney.

DR. GWALTNEY: I think the real question is what do you tell the mother whose boy has died, and she's learned he had sickle cell trait, and she says I hear that he was more at risk, and whether what you say is -- Nothing is going to make the mother feel good, but is that a reasonable thing? Can you look her in the eye and tell her that?

I think that's our best argument, what you just said. Patriotism, I believe, is a true argument, but I don't think politicians will buy that much, but I think your argument is probably the best.

The other argument is that it didn't matter, because we did everything we could to prevent it anyway. We had the prevention measures in place, but that's it. That's what you know. You know, that's the problem.

DR. LUEPKER: It's going to make the commanding officer in the field a little less

certain. Now we've screened them and we've counseled them and (inaudible) I think you just mentioned that we are doing what we can to protect all our recruits.

CHAIRMAN FLETCHER: Anymore comments or questions on the motion?

DR. LUEPKER: Of course, if we don't screen, how are we going to know (inaudible).

CHAIRMAN FLETCHER: More questions, comments? The motion has been made and seconded to discontinue screening for sickle cell trait, but continue studies, use general preventive measures, control fluids, and to state the reasons as we make this statement for data supporting our decision.

The question has been called. All in favor of the motion?

COL. FOGELMAN: Count them. Raise your hands high, please. Are you voting?

CHAIRMAN FLETCHER: Should I vote?

COL. FOGELMAN: Yes.

CHAIRMAN FLETCHER: I'm voting for it.

COL. FOGELMAN: Six? Okay. Then opposed? One opposed? Two opposed.

DR. SCHAFFNER: You know, you need to

record that Dr. Stevens was absent.

CHAIRMAN FLETCHER: Dr. Lee said she would go with the Board. She supports what the Board votes. Very difficult.

I already have one letter that I've sort of written out. It's not too different, just a draft. Okay. We'll do that.

So the next issue, Vicky, on the calendar?

COL. FOGELMAN; Yes. Well, we had the two issues this morning. Dr. Patterson -- I thought we could maybe break up. Actually, I thought we were going to break up a little earlier, and discuss maybe the environmental issues separately from the injury control issue which we talked about earlier.

Is that what the Board would like to do or shall we --

CHAIRMAN FLETCHER: Well, the Board would like to hear these issues together.

DR. BROOME: Is there an issue laid down, and we would bring it back and circulate it around the Board?

COL. FOGELMAN: Right. There's no need -- On the issue of the vaccine issue that

was discussed this morning, we do not have to come up with a final decision for that. All I wanted you to do was look at the information and tell me if you need additional information and be thinking about it, because it's going to come up very soon. So you should be planning what to respond.

DR. BROOME: The thing is I was concerned that the Board had made a recommendation to expedite the findings for the botin toxoid, inquiring what the status of that was. I would prefer to get a detailed report on what has happened, not just assurance that it -- and I think this is sort of a generic issue for the Board, that if we make a recommendation and we wrestle and struggle with trying to come up with what we think is right, we would like to know what's the progress with it, are you going to, and etcetera.

COL. FOGELMAN: Okay. I'll try to find somebody who has that information. I'll try to get that for you --

Okay. I think, in the interest of time, because I know we said we were going to try and end at four -- Would the group prefer to stay

together or split up?

CHAIRMAN FLETCHER: I think it would probably be best unless you have strong feelings. Let's stay together.

COL. FOGELMAN: Fine. I don't really mind. Okay. Do you have anything additional you wanted to talk about?

DR. PERROTTA: Not specifically about the task. I think probably in Colorado Springs we need to probably lay out better ways to facilitate work groups given two weeks notice. What's probably going to happen is that their team is going to be able to compile a large amount of information in hard copy and put it in an overnight Express Mail to me and maybe to a couple of other people, and we might be able to get together by telephone once, maybe twice, and answer questions that, you know, may be as tricky certainly to do it that way, but that's the decision to -- I think, anyway.

DR. PERROTTA: But as far as the information goes, probably the best source is going to be the Army Chemical Defense Groups. Claire and I have talked about possible resources within her group, and I will work towards that as

well. So, I mean, there's not really much you can do.

COL. FOGELMAN: Do you need additional assistance? Do you need some help from other members of the Board on this?

DR. PERROTTA: Of course, but I'm not even sure that even the best minds can come up with a product that's going to be of great utility or is going to -- is really going to do a service to it in two weeks.

So, you know, no matter who you get me, they are all going to be smarter than I am on this topic, and you know, I'm just not sure how much more we're going to be able to add to this process.

COL. FOGELMAN: Do you think there's any way of extending this deadline at all?

COL. PATTERSON: I doubt it. For reasons which I'm not completely familiar with, Dr. Joseph set this time frame in his Congressional testimony on Tuesday. I'm trying to remember specifics. He did indicate a July 15th date for a number of activities that the Department was doing in response to the incident.

So you know, I think as we've talked

about it among the staff and with Dr. Bazouki, the hope is that we would get the best product possible from the Board within the period of time and, depending on that, if there was indication that we clearly needed to perhaps do another initiative, more review, that we would -- that would be the next step.

So I think he sees it initially as a preliminary, certainly not the definitive, review of the issue, but to give him some sense of perhaps what would be the appropriate course of action.

We are looking at funding some research in, as to date, not clearly defined areas. So whatever the Board could provide us, I think, Dr. Joseph would be most appreciative, realizing the limitations that you have.

(Whereupon, the proceedings went off the record at 3:50 p.m.)